AD-A099 963 FEDERAL AVIATION ADMINISTRATION TECHNICAL CENTER ATL--ETC F/G 1/2
MIAMI INTERNATIONAL AIRPORT DATA PACKAGE NUMBER 2. AIRPORT IMPR--ETC(U)
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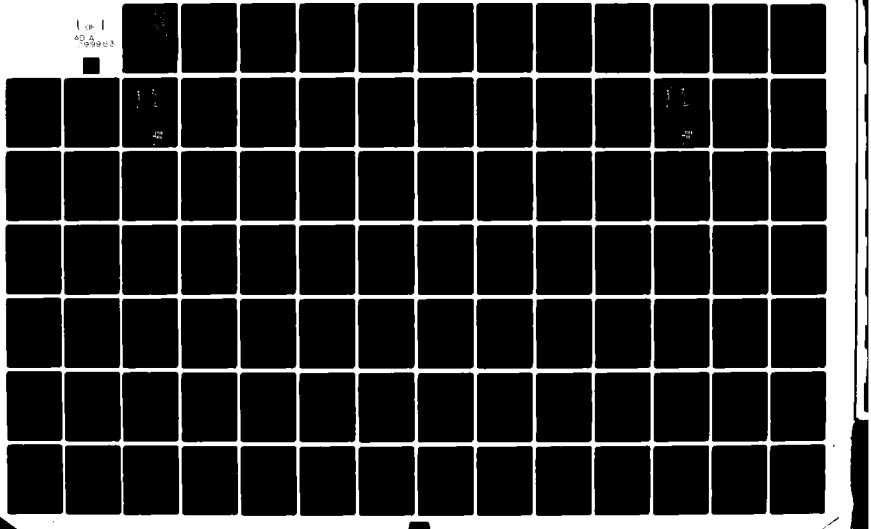

LEVEL III

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(1)

MIAMI INTERNATIONAL AIRPORT

DATA PACKAGE NO. 2. Number

AIRPORT IMPROVEMENT TASK FORCE DELAY STUDIES.

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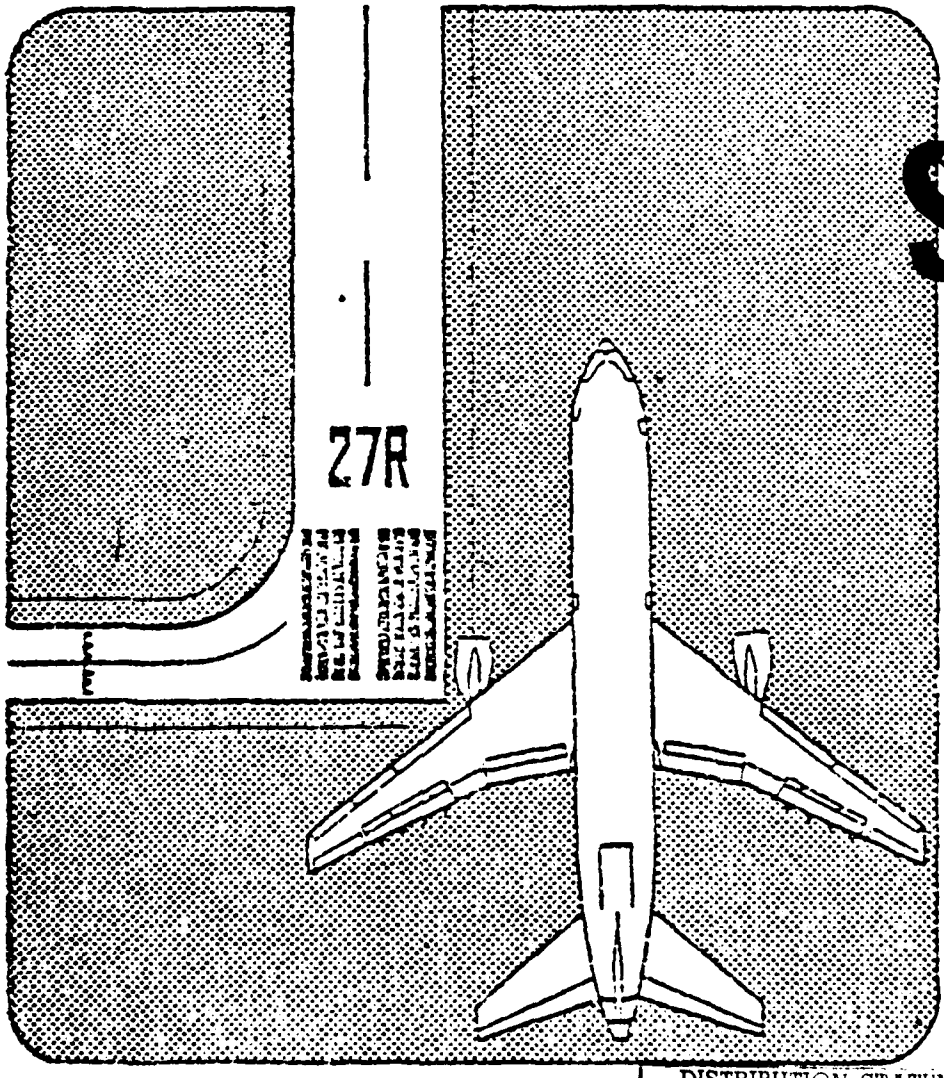

JANUARY 1979

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DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

DATE: January 5, 1979

IN REPLY REFER TO: ANA-220

NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER
ATLANTIC CITY, NEW JERSEY 08405

SUBJECT: Miami Simulation Model Calibration Results and Input Data Summary for Stage 1 Experiments

FROM: NAFEC Program Manager, ANA-220

TO: Ray Fowler, AEM-100

Enclosed are data packages for use during the third Task Force meeting on January 24, 1979.

. Attachment A presents the results of the Simulation Model Calibration.

. Attachment B contains the model input data for Configurations A and B.

. Attachment C contains the model input summary for the Miami Stage 1 Experiments.

. Attachment D contains a table of the Miami Stage 2 Experiments.

These attachments should be reviewed, revised, and approved by the Miami Task Force prior to use in the model runs.

JOHN R. VANDERVEER

Enclosures

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Availability Codes
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LIST OF ILLUSTRATIONS

LIST OF TABLES

ATTACHMENT A

SIMULATION MODEL
CALIBRATION OUTPUT DATA

A. FLOW RATES
B. DELAYS
C. TRAVEL TIMES

} SEE HOURLY SUMMARY (TABLE 1) AND QUARTER HOUR FIGURES 1 TO 5

Miami International Airport

Miami
Airport Improvement Task Force Delay Studies

January 1979

Table 1

Hourly Comparison of Output Data
for Simulation Model Calibtation

Time(Gmt)	Arrival Flow Rate Data/Model (S.D.)		Departure Flow Rate Data/Model (S.D.)	
1600-1700	43	44 (0.74)	13	14 (0.42)
1700-1800	45	47 (0.74)	31	32 (0.42)
1800-1900	25	23 (0.00)	42	39 (0.00)

Time (Gmt)	Average Arrival Air Delay (min) Data/Model (S.D.)		Average Fix to Threshold Travel Time (min) Data/Model (S.D.)	
1600-1700	1.97	0.90 (0.11)	12.56	9.33 (0.11)
1700-1800	2.29	2.20 (0.39)	11.96	11.90 (0.40)
1800-1900	1.55	0.20 (0.02)	11.24	10.13 (0.02)

Time (Gmt)	Average Arrival Threshold to Gate Travel Time (min) Data/Model (S.D.)		Average Departure Gate to Roll Travel Time (min) Data/Model (S.D.)	
1600-1700	2.43	3.10 (0.06)	5.91	4.71 (0.32)
1700-1800	3.13	3.09 (0.09)	6.62	7.07 (0.46)
1800-1900	2.92	2.80 (0.08)	5.91	5.51 (0.16)

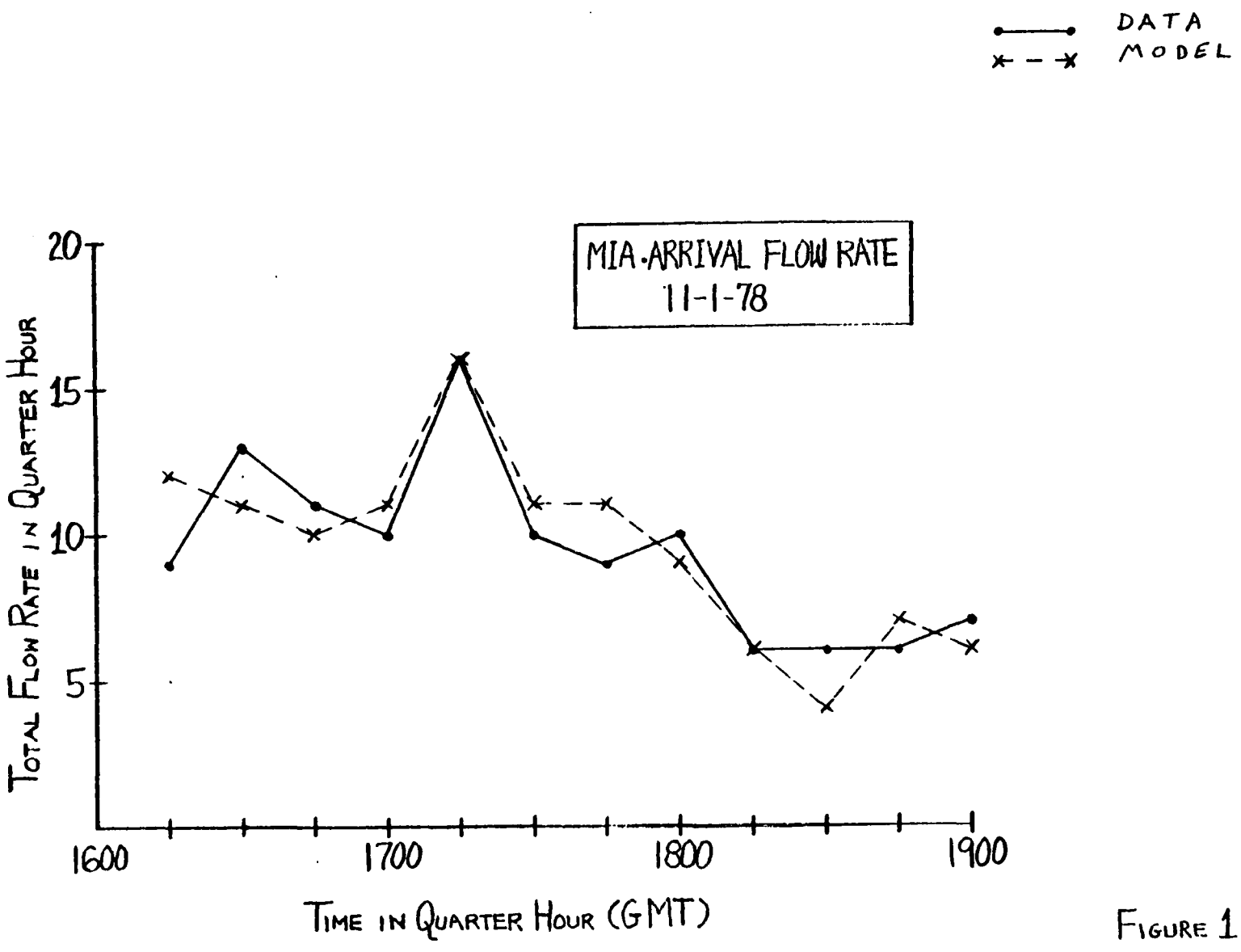
DATA
MODEL
MIA ARRIVAL FLOW RATE
11-1-78
20
15
10
5
TOTAL FLOW RATE IN QUARTER HOUR
1600
1700
1800
1900
TIME IN QUARTER HOUR (GMT)

FIGURE 1

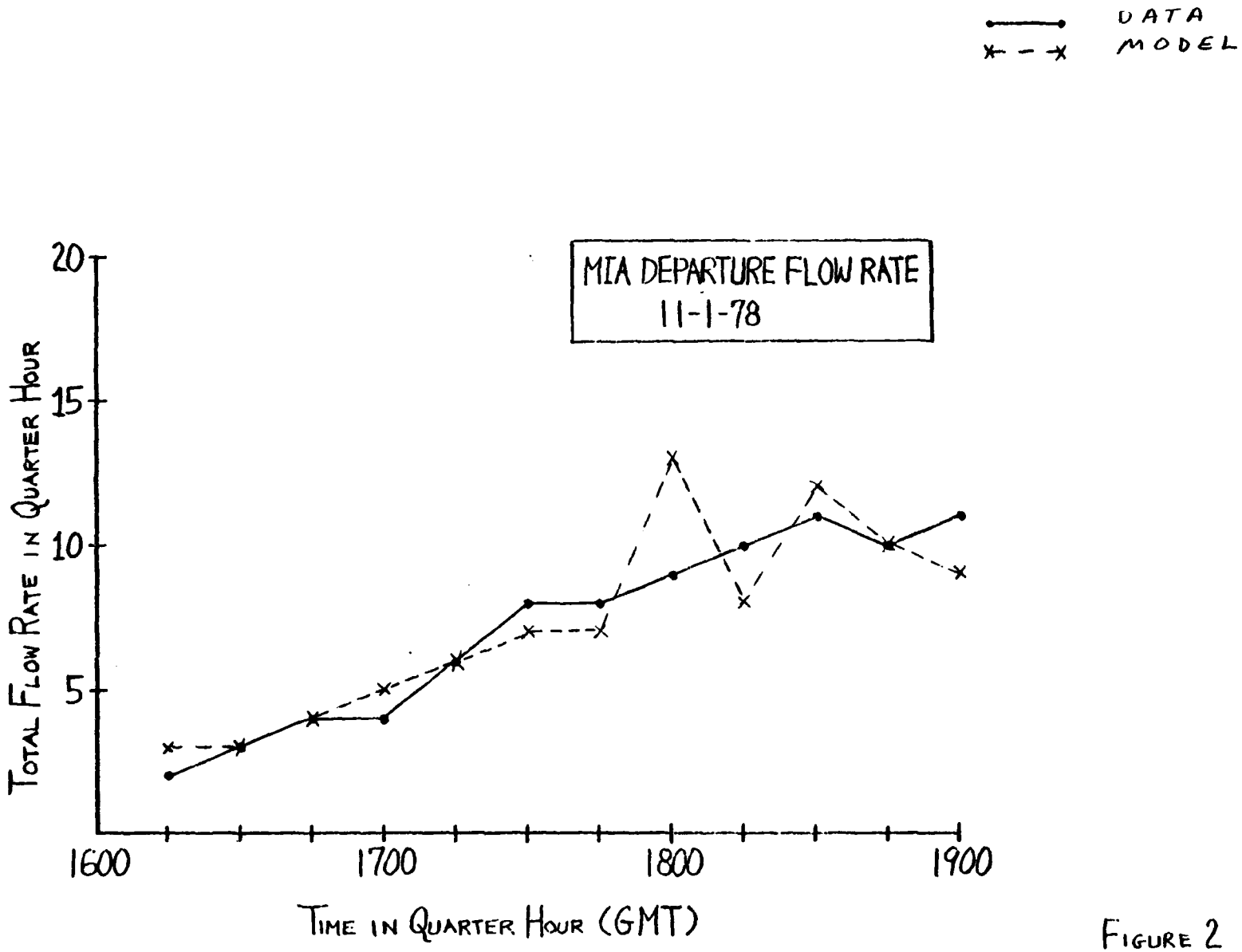
DATA
MODEL
MIA DEPARTURE FLOW RATE
11-1-78
TOTAL FLOW RATE IN QUARTER HOUR
20
15
10
5
1600
1700
1800
1900
TIME IN QUARTER HOUR (GMT)

FIGURE 2

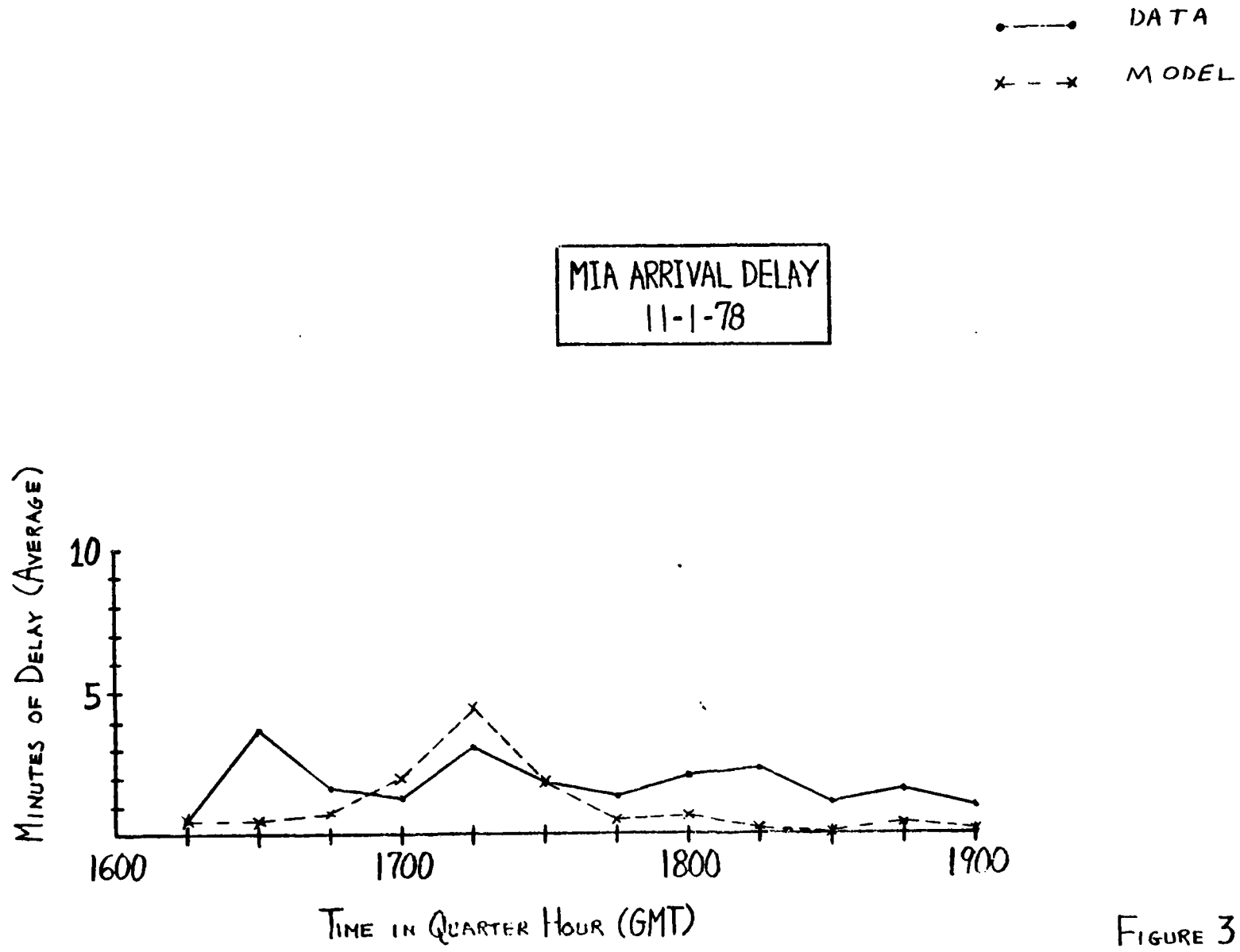
DATA
MODEL
MIA ARRIVAL DELAY
11-1-78
MINUTES OF DELAY (AVERAGE)
10
5
1600
1700
1800
1900
TIME IN QUARTER HOUR (GMT)

FIGURE 3

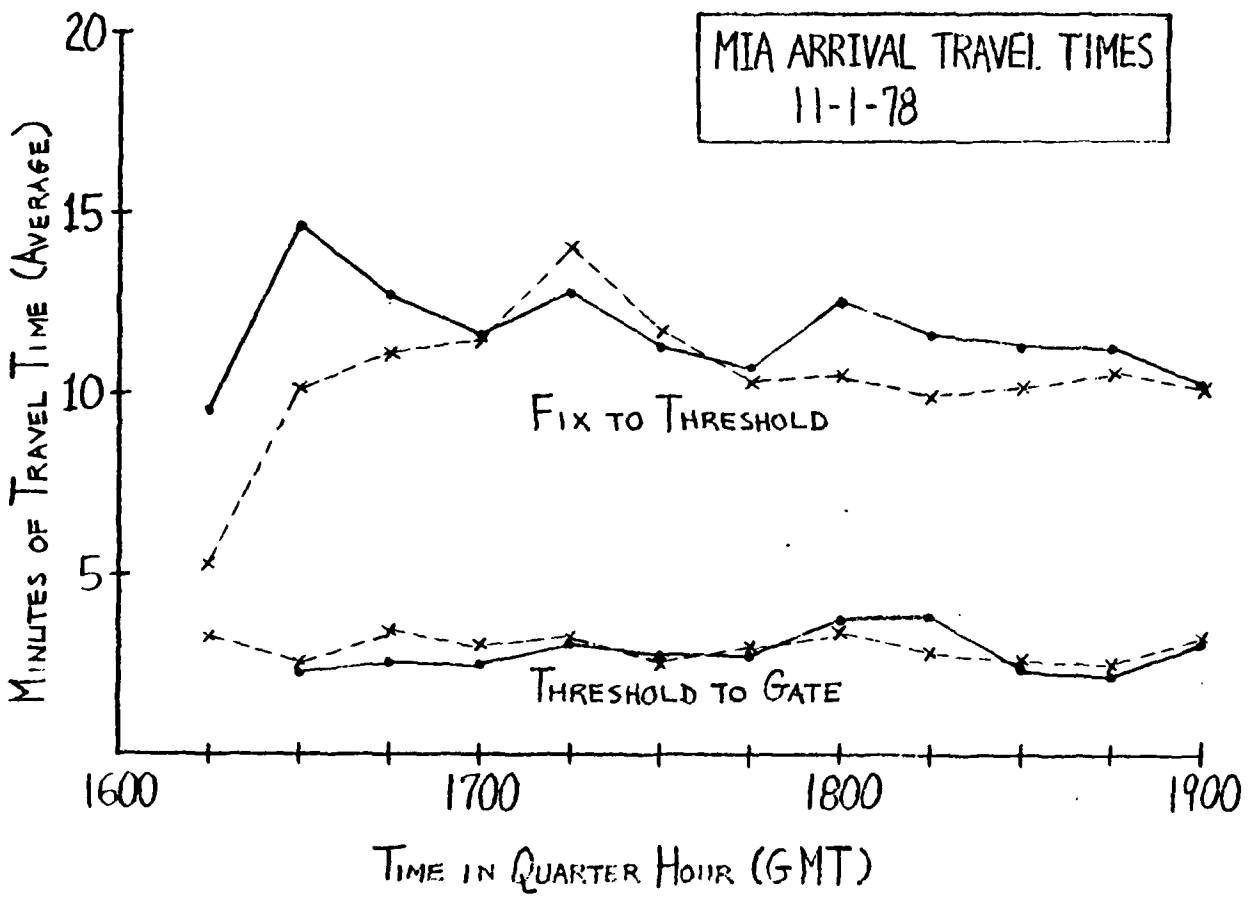
DATA
MODEL
MIA ARRIVAL TRAVEL TIMES
11-1-78
20
15
10
5
MINUTES OF TRAVEL TIME (AVERAGE)
FIX TO THRESHOLD
THRESHOLD TO GATE
1600
1700
1800
1900
TIME IN QUARTER HOUR (GMT)

FIGURE 4

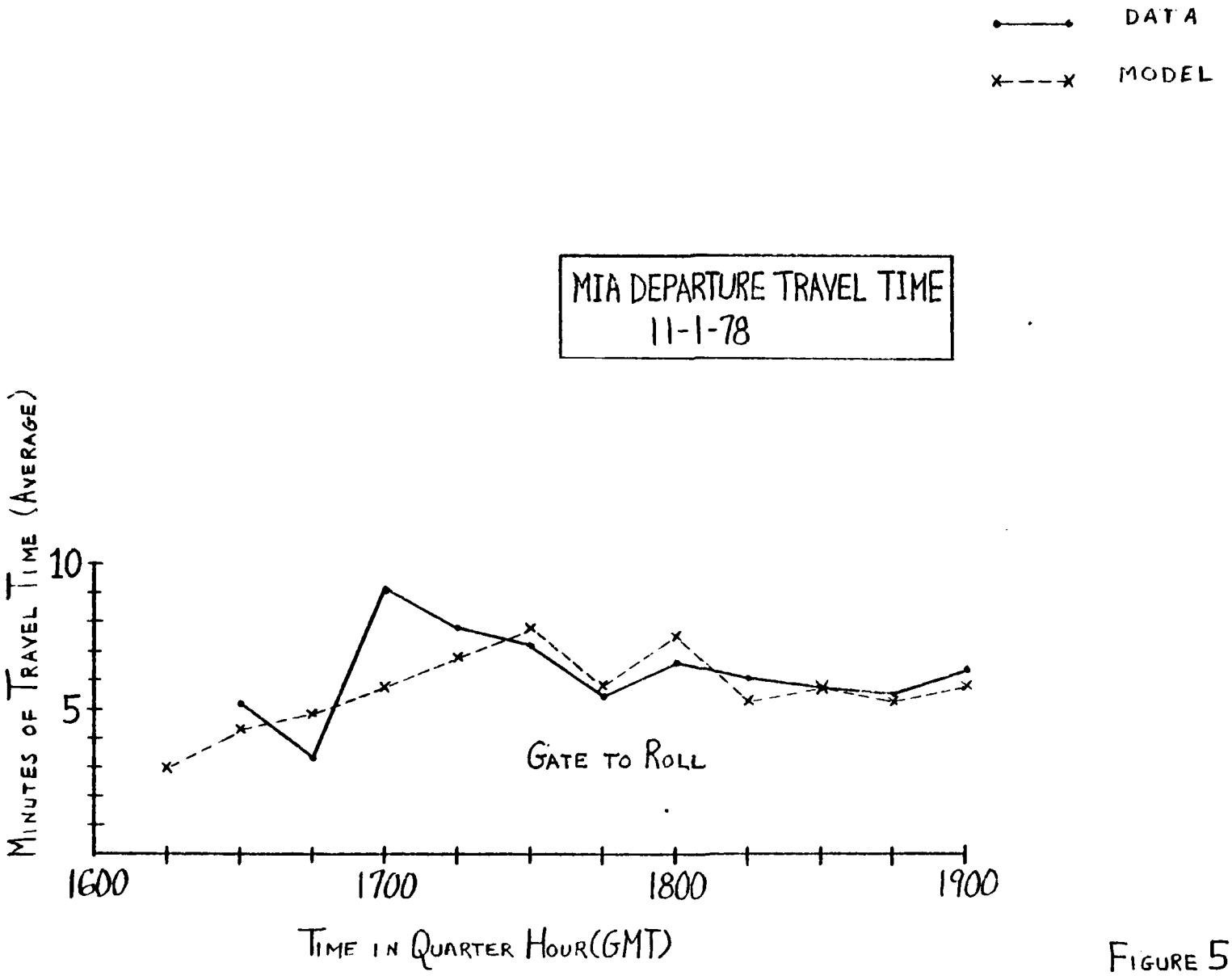
DATA
MODEL
MIA DEPARTURE TRAVEL TIME
11-1-78
MINUTES OF TRAVEL TIME (AVERAGE)
10
5
GATE TO ROLL
1600
1700
1800
1900
TIME IN QUARTER HOUR(GMT)

FIGURE 5

ATTACHMENT B

Configurations A and B
Model Input Data

Miami International Airport

Miami
Airport Improvement Task Force Delay Studies

January 1979

Miami Airport Configuration

There are two basic configurations (for the airport) selected for study by the Miami Task Force. All the experiments considered in the technical plan can be performed using one of the following configurations. The variation of the input (such as runway assignments for arrivals and departures) can control the experiment to reflect the desired conditions of the test.

The two configurations are:

A. EASTERLY CONFIGURATION (See figure 6)

RUNWAYS	MODEL RUNWAY NO.
9R	1
9L	2
12	3

B. WESTERLY CONFIGURATION (See figure 7)

RUNWAYS	MODEL RUNWAY NO.
27R	1
27L	2
30	3

The link-node diagram for the airport required to develop the route structure for each configuration is shown in figure 8.

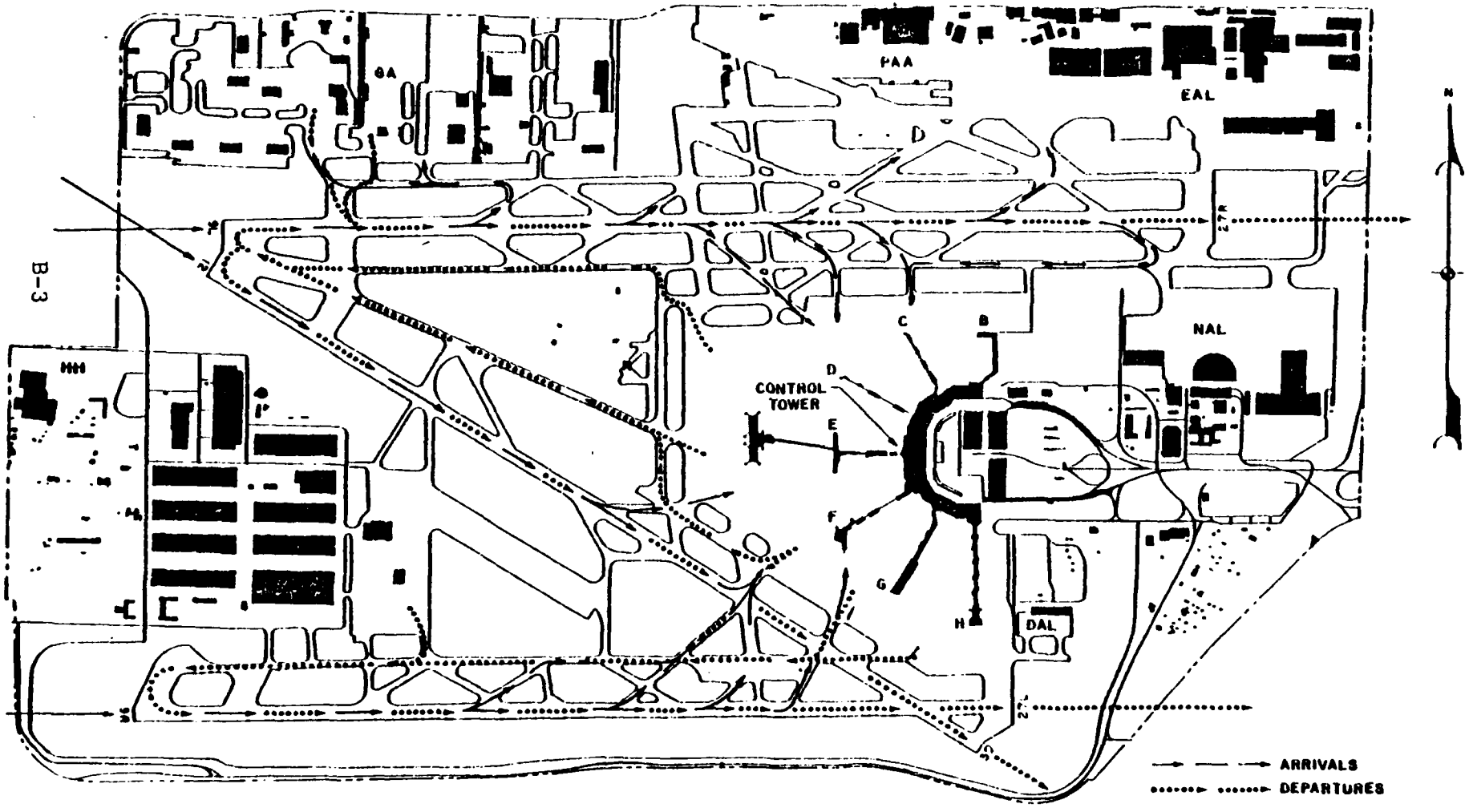

Figure 6
MIAMI EASTERLY CONFIGURATION

INPUT DATA

MIAMI INTERNATIONAL AIRPORT AIRFIELD SIMULATION MODEL CALIBRATION RUN 11-1-78

NUMBER OF RANDOM NUMBER SEEDS
10

RANDOM NUMBER SEEDS
2017 3069 4235 5873 6981 7137 8099 9355 123 1985

START TIME AND FINISH TIME
16& 0 19& 5

PRINT OPTIONS
F F F F F

NUMBER OF AIRLINES
12

AIRLINE CODES
IA EA DD FF GG HH C1 C2 F1 F2
F3 GA

NUMBER OF RUNWAYS
3

RUNWAY NAMES
9R 9L 12

RUNWAY END LINK NUMBERS
412 432 421

RUNWAY CROSSING LINKS--CLEARANCE TIMES FOR A/C CROSSING ACTIVE RUNWAY

XNG LINK	RUNWAY	ARRIVAL ON R/W	DEPARTURE ON R/W	ARRIVAL ON FINAL
227	2	47. 43. 42&	46& 47&	47. 42. 42. 20. 20. 20. 20.
XNG LINK	RUNWAY	ARRIVAL ON R/W	DEPARTURE ON R/W	ARRIVAL ON FINAL
228	2	47. 43. 42&	46. 47&	47. 42. 42. 20. 20. 20. 20.
XNG LINK	RUNWAY	ARRIVAL ON R/W	DEPARTURE ON R/W	ARRIVAL ON FINAL
258	2	51. 49. 46.	50. 47&	47. 42. 42. 20. 20. 20. 20.
XNG LINK	RUNWAY	ARRIVAL ON R/W	DEPARTURE ON R/W	ARRIVAL ON FINAL
259	2	51. 49. 46&	50. 47&	47. 42. 42. 20. 20. 20. 20.
XNG LINK	RUNWAY	ARRIVAL ON R/W	DEPARTURE ON R/W	ARRIVAL ON FINAL
267	3	47. 43. 42&	46. 47&	47. 42. 42. 20. 20. 20. 20.
XNG LINK	RUNWAY	ARRIVAL ON R/W	DEPARTURE ON R/W	ARRIVAL ON FINAL
266	3	47. 43. 42&	46. 47.	47& 42. 42. 20. 20. 20. 20.
XNG LINK	RUNWAY	ARRIVAL ON R/W	DEPARTURE ON R/W	ARRIVAL ON FINAL
121	3	47. 43. 42&	46& 47&	47. 42. 42. 20. 20. 20. 20.
XNG LINK	RUNWAY	ARRIVAL ON R/W	DEPARTURE ON R/W	ARRIVAL ON FINAL
280	3	47. 43. 42&	46& 47.	47. 42. 42. 20. 20. 20. 20.
XNG LINK	RUNWAY	ARRIVAL ON R/W	DEPARTURE ON R/W	ARRIVAL ON FINAL
282	3	47. 43. 42&	46. 47&	47. 42. 42. 20. 20. 20. 20.

RUNWAY CROSSING TIME AND INTERARRIVAL GAP

LINK	DELAY	MEAN	STD DEV
227	1.50	1.00	.50
228	1.50	1.00	.50
258	1.50	1.00	.50
259	1.50	1.00	.50
267	1.50	1.00	.50
266	1.50	1.00	.50
121	1.50	1.00	.50
280	1.50	1.00	.50
282	1.50	1.00	.50

NUMBER OF EXITS

21

DISTANCE IN FEET FROM THRESHOLD TO THE EXIT TAXIWAY (EXIT LINK NO. VERSUS DISTANCE)

311	1120.0	321	2470.0	329	2682.0	319	3630.0	302	4222.0
316	4400.0	284	4799.0	287	4972.0	270	5110.0	259	5732.0
323	5769.0	290	5992.0	273	6140.0	272	6650.0	293	6702.0
280	6980.0	266	6649.0	282	7589.0	121	7590.0	298	8052.0
178	9200.0								

NUMBER OF HOLDING AREAS

1

HOLDING AREA NUMBERS

99

NUMBER OF G/A BASING AREAS

1

G/A BASING AREA NUMBERS

19

AIRLINE GATES
IA
4 5 6
EA
1 2
DD
3 4
FF
6 7
GG
7 8
HH
9
C1
3 4
C2
9
F1
20
F2
16
F3
21 22 23
GA
0

TRUNCATION LIMITS
UPPER LIMIT = 3.00
LOWER LIMIT = 3.00

DEPARTURE QUEUE LENGTH AND INTERARRIVAL GAP
QUEUE = 6 MEAN = 2.00 STD DEV = 0.00

LENGTHS OF COMMON APPROACH PATHS FROM OUTER MARKER TO THRESHOLD IN NAUTICAL MILES (RUNWAY NO., A/C CLASS, LENGTH)

1	1	7.00
1	2	7.00
1	3	3.00
1	4	3.00
2	1	7.00
2	2	7.00
2	3	3.00
2	4	3.00
3	1	7.00
3	2	7.00
3	3	3.00
3	4	3.00

TAXIWAY PATH DATA
THIS AIRPORT USES THE FOLLOWING:
LINKS: 338 PATHS: 717 PATH SEGMENTS: 20772
AVERAGE PATH LENGTH IS 28.97 SEGMENTS

TAXIWAY TWO-WAY PATHS

LINKS 17
106 107 108 350 109 110 111 112 351 113
114 115 116 352 117 118 353
LINKS 17
353 118 117 352 116 115 114 113 351 112
111 110 109 350 108 107 106
LINKS 4
266 358 265 357
LINKS 4
357 265 358 266
LINKS 9
382 190 191 192 193 194 195 196 363
LINKS 9
363 196 195 194 193 192 191 190 382
LINKS 3
266 358 265
LINKS 3
265 358 266
LINKS 14
531 199 200 201 202 203 204 380 205 206
207 208 209 379
LINKS 14
379 209 208 207 206 205 380 204 203 202
201 200 199 531
LINKS 9
356 173 174 354 175 176 177 386 527
LINKS 9
527 386 177 176 175 354 174 173 356
LINKS 4
377 212 213 376
LINKS 14
352 116 115 114 113 351 112 111 110 109
350 108 107 106
LINKS 3
279 125 357
LINKS 3
357 125 279
LINKS 3
279 126 361
LINKS 3
361 126 279
LINKS 4
369 136 137 371
LINKS 4
371 137 136 369
LINKS 6
362 128 129 130 131 364
LINKS 6
364 131 130 129 128 362
LINKS 4
372 153 152 151
LINKS 4
151 152 153 372
LINKS 4
376 213 212 377

A/C SEPARATIONS
128 SEPARATION VALUES IN 4 SETS OF 32; ARRIVAL / ARRIVAL, DEPARTURE / ARRIVAL, DEPARTURE / DEPARTURE AND ARRIVAL / DEPARTURE
EACH SET OF 32 IS COMPOSED OF 16 PAIRS OF MEAN AND STANDARD DEVIATION
THE 16 SETS ARE POSSIBLE WAYS OF A/C CLASS X FOLLOWED BY A/C CLASS Y
THERE ARE 4 A/C CLASSES -- 1) D CLASS
2) C CLASS
3) B CLASS
4) A CLASS
THE ORDER OF SETS OF (X,Y) IS)
(1,1), (1,2), (1,3), (1,4), (2,1), (2,2), (2,3), (2,4)
(3,1), (3,2), (3,3), (3,4), (4,1), (4,2), (4,3), (4,4)

LEAD A/C RUNWAY 0 LEAD A/C FIX 0 TRAIL A/C RUNWAY 0 TRAIL A/C FIX 0
128 SEPARATION VALUES IN 4 SETS OF 32, A/A (N.MILES), D/A (N.MILES), D/D (MINUTES) AND A/D (MINUTES)

4.10	.70	4.90	.65	5.70	.60	5.60	.55
3.30	.70	3.20	.65	3.90	.60	3.80	.55
3.30	.70	3.20	.65	3.10	.60	3.00	.55
3.30	.70	3.20	.65	3.10	.60	3.00	.55
1.89	.26	1.76	.25	1.63	.24	1.63	.24
1.89	.26	1.76	.25	1.63	.24	1.63	.24
1.65	.25	1.54	.24	1.41	.23	1.41	.23
1.65	.25	1.54	.24	1.41	.23	1.41	.23
1.90	.08	2.40	.08	2.40	.08	2.40	.08
1.40	.08	1.40	.08	1.23	.08	1.23	.08
1.23	.08	1.15	.08	.98	.08	.98	.08
1.23	.08	1.15	.08	.98	.08	.98	.08
.88	.16	.78	.19	.97	.23	.74	.09
.88	.16	.78	.19	.97	.23	.74	.09
.88	.16	.78	.19	.97	.23	.74	.09
.88	.16	.78	.19	.97	.23	.74	.09

LEAD A/C RUNWAY 1 LEAD A/C FIX 0 TRAIL A/C RUNWAY 3 TRAIL A/C FIX 0
128 SEPARATION VALUES IN 4 SETS OF 32, A/A (N.MILES), D/A (N.MILES), D/D (MINUTES) AND A/D (MINUTES)

4.35	.70	5.13	.65	5.91	.60	5.79	.55
3.55	.70	3.43	.65	4.11	.60	3.99	.55
3.55	.70	3.43	.65	3.31	.60	3.19	.55
3.55	.70	3.43	.65	3.31	.60	3.19	.55
1.89	.26	1.76	.25	1.63	.24	1.63	.24
1.89	.26	1.76	.25	1.63	.24	1.63	.24
1.65	.25	1.54	.24	1.41	.23	1.41	.23
1.65	.25	1.54	.24	1.41	.23	1.41	.23
1.90	.08	2.40	.08	2.40	.08	2.40	.08
1.40	.08	1.40	.08	1.23	.08	1.23	.08
1.23	.08	1.15	.08	.98	.08	.98	.08
1.23	.08	1.15	.08	.98	.08	.98	.08
.88	.16	.78	.19	.97	.23	.74	.09
.88	.16	.78	.19	.97	.23	.74	.09
.88	.16	.78	.19	.97	.23	.74	.09
.88	.16	.78	.19	.97	.23	.74	.09

LEAD A/C RUNWAY 3 LEAD A/C FIX 0 TRAIL A/C RUNWAY 1 TRAIL A/C FIX 0
128 SEPARATION VALUES IN 4 SETS OF 32, A/A (N.MILES), D/A (N.MILES), D/D (MINUTES) AND A/D (MINUTES)

4.35	.70	9.13	.65	5.91	.60	5.79	.55
3.55	.70	3.43	.65	4.11	.60	3.99	.55
3.55	.70	3.43	.65	3.31	.60	3.19	.55
3.55	.70	3.43	.65	3.31	.60	3.19	.55
1.89	.26	1.76	.25	1.63	.24	1.63	.24
1.89	.26	1.76	.25	1.63	.24	1.63	.24
1.65	.25	1.54	.24	1.41	.23	1.41	.23
1.65	.25	1.54	.24	1.41	.23	1.41	.23
1.90	.08	2.40	.08	2.40	.08	2.40	.08
1.40	.08	1.40	.08	1.23	.08	1.23	.08
1.23	.08	1.15	.08	.98	.08	.98	.08
1.23	.08	1.15	.08	.98	.08	.98	.08
.88	.16	.78	.19	.97	.23	.74	.09
.88	.16	.78	.19	.97	.23	.74	.09
.88	.16	.78	.19	.97	.23	.74	.09
.88	.16	.78	.19	.97	.23	.74	.09

LEAD A/C RUNWAY 2 LEAD A/C FIX 0 TRAIL A/C RUNWAY 3 TRAIL A/C FIX 0
128 SEPARATION VALUES IN 4 SETS OF 32, A/A (N.MILES), D/A (N.MILES), D/D (MINUTES) AND A/D (MINUTES)

4.35	.70	5.13	.65	5.91	.60	5.79	.55
3.55	.70	3.43	.65	4.11	.60	3.99	.55
3.55	.70	3.43	.65	3.31	.60	3.19	.55
3.55	.70	3.43	.65	3.31	.60	3.19	.55
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

LEAD A/C RUNWAY 3 LEAD A/C FIX 0 TRAIL A/C RUNWAY 2 TRAIL A/C FIX 0
128 SEPARATION VALUES IN 4 SETS OF 32, A/A (N.MILES), D/A (N.MILES), D/D (MINUTES) AND A/D (MINUTES)

4.35	.70	5.13	.65	5.91	.60	5.79	.55
3.55	.70	3.43	.65	4.11	.60	3.99	.55
3.55	.70	3.43	.65	3.31	.60	3.19	.55
3.55	.70	3.43	.65	3.31	.60	3.19	.55
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

VECTORING DELAY INPUTS

FIX	DELAY EVALUATION LEVEL	HOLDING PCT.	MAXIMUM VECTORING DELAY	MINIMUM HOLDING DELAY
1	4.00	100.00	4.00	2.00
2	4.00	100.00	4.00	2.00
3	4.00	100.00	4.00	2.00
4	4.00	100.00	4.00	2.00
5	4.00	100.00	4.00	2.00
6	4.00	100.00	4.00	2.00
7	4.00	100.00	4.00	2.00
8	4.00	100.00	4.00	2.00
10	4.00	100.00	4.00	2.00

TAKE-OFF QUEUE SWITCH FOR RUNWAY 1 = 99

TAKE-OFF QUEUE SWITCH FOR RUNWAY 2 = 99

TAKE-OFF QUEUE SWITCH FOR RUNWAY 3 = 99

TAKE-OFF QUEUE SWITCH FOR RUNWAY 4 = 0

TAKE-OFF QUEUE SWITCH FOR RUNWAY 5 = 0

GATE HOLD LIMIT = 5 HOLD TIME = 4.00

GATE HOLD LIMIT = 5 HOLD TIME = 4.00

GATE HOLD LIMIT = 5 HOLD TIME = 4.00

AIRSPACE DELAYS

FIX	OCCURENCE PERCENTAGE	HOLD MEAN	HOLD SIGMA

A/C DEPARTURE RUNWAY OCCUPANCY TIME IN SECONDS (A/C CLASS, MEAN, AND STD. DEV.)

1	39.00	4.00
2	39.00	4.00
3	34.00	4.00
4	34.00	4.00

TOUCH-AND-GO RUNWAY OCCUPANCY TIME IN SECONDS (A/C CLASS, MEAN, AND STD. DEV.)

1	0.00	0.00
2	0.00	0.00
3	0.00	0.00
4	0.00	0.00

GATE SERVICE TIME DISTRIBUTION (PROBABILITY VS TIME)

CLASS 1

0.00

CLASS 2

0.00

CLASS 3

0.00

CLASS 4

0.00

A/C APPROACH SPEED IN KNOTS (A/C CLASS, MEAN, STD. DEV.)

1	140.00	5.00
2	130.00	5.00
3	120.00	5.00
4	100.00	5.00

```
RUNWAY EXIT SELECTION--USAGE PERCENTAGE BY EACH A/C CLASS AND BY EACH RUNWAY (EXIT LINK NO. VERSUS PROBABILITY)
CLASS  1 RWY   1
    178.     .07    280.     .46    272.     .51    273.     .84    270.    1.00

CLASS  2 RWY   1
    178.     .15    280.     .30    272.     .32    273.     .72    270.     .98
    316.     .99    319.    1.00
CLASS  3 RWY   1
    178.     .11    280.     .18    270.     .55    316.     .62    319.     .81
    321.     .96    311.    1.00
CLASS  4 RWY   1
    311.     .99    321.    1.00
CLASS  1 RWY   2
    296.     .03    298.     .16    293.     .65    290.     .96    287.    1.00

CLASS  2 RWY   2
    302.     .09    298.     .12    293.     .38    290.     .77    259.     .91
    287.    1.00
CLASS  3 RWY   2
    302.     .27    293.     .30    290.     .38    259.     .45    287.     .64
    329.    1.00
CLASS  4 RWY   2
    302.     .07    293.     .14    290.     .21    259.     .28    329.    1.00

CLASS  1 RWY   3
    266.     .99    121.    1.00
CLASS  2 RWY   3
    282.     .20    121.     .40    266.     .80    323.     .90    284.    1.00

CLASS  3 RWY   3
    121.     .99    266.    1.00
CLASS  4 RWY   3
      0.

THE ARRIVAL RUNWAY OCCUPANCY TIME IN SECONDS BY A/C CLASS (DISTANCE IN FEET FROM THRESHOLD TO EXIT TAXIWAY VERSUS TIME)
CLASS  1
  4972.0   40.00  5110.0   54.00  5992.0   49.00  6140.0   52.00  6649.0   48.00
  6650.0   67.00  6702.0   47.00  6980.0   64.00  8052.0   58.00  9200.0   76.00
CLASS  2
  3630.0   43.00  4222.0   47.00  4400.0   55.00  4799.0   35.00  4972.0   40.00
  5110.0   49.00  5732.0   46.00  5769.0   44.00  5992.0   47.00  6140.0   52.00
  6649.0   63.00  6690.0   51.00  6702.0   48.00  6980.0   60.00  7589.0   60.00
  7590.0   68.00  8052.0   59.00  9200.0   77.00
CLASS  3
  2470.0   30.00  2682.0   33.00  3630.0   40.00  4400.0   55.00  4972.0   46.00
  5110.0   53.00  5732.0   62.00  5992.0   56.00  6649.0   33.00  6702.0   65.00
  6980.0   60.00  7590.0   66.00  9200.0   22.00
CLASS  4
  2682.0   63.00  5732.0   66.00  5992.0   62.00  6702.0   47.00

TAXIING SPEEDS IN MPH
    5.00    10.00    15.00    20.00    25.00    30.00

A/C LATENESS DISTRIBUTION IN MINUTES (RANDOM NUMBER VERSUS TIME)
    0.00
```

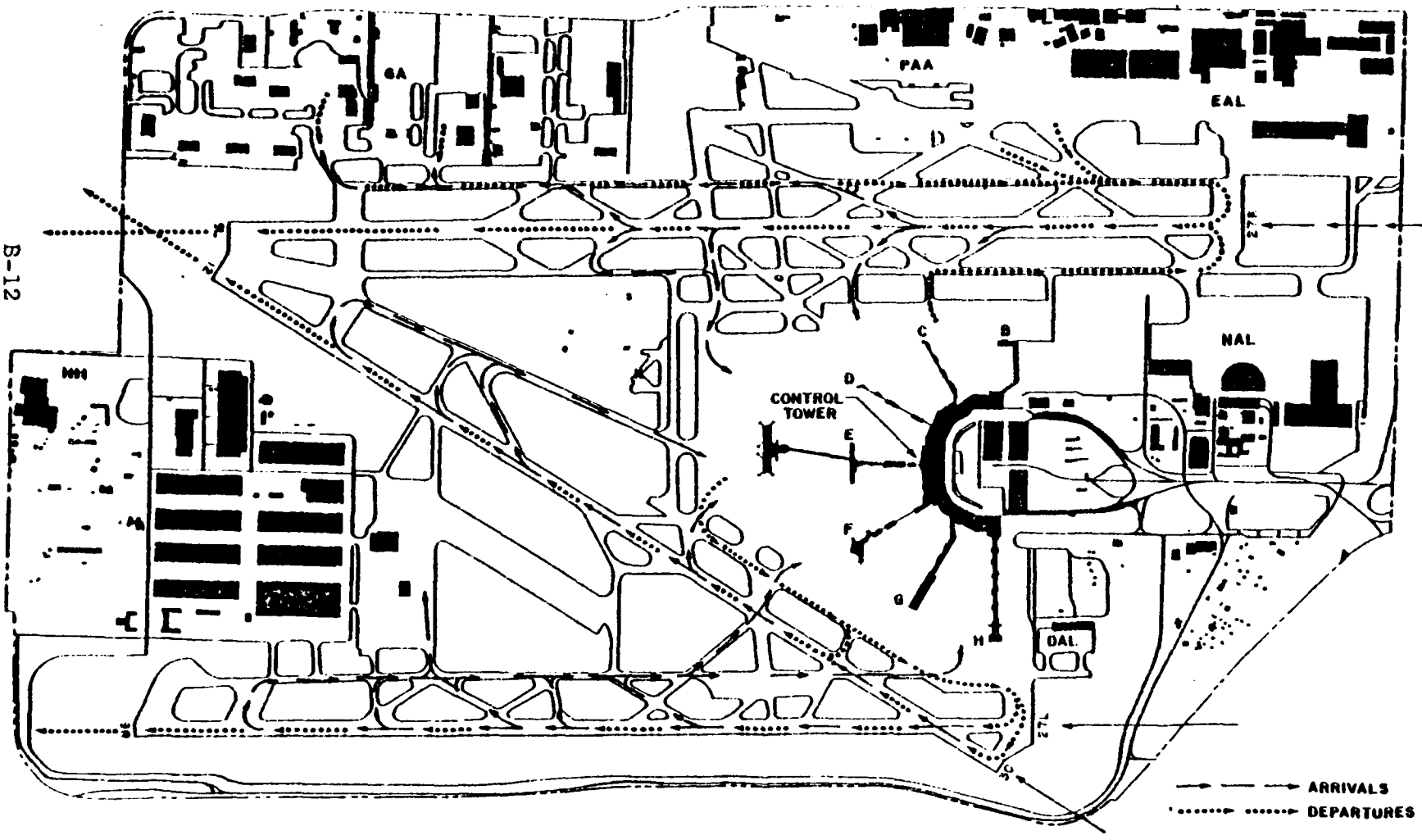

Figure 7
MIAMI WESTERLY CONFIGURATION

MIAMI INTERNATIONAL AIRPORT
C-0360 HJL 7-13-76

MIAMI CONFIGURATION 'B'

RWY NAMES

27R 27L 30

RWY END LINKS

422 401 413

RWY XING LINKS

1	227
1	228
1	258
1	259
3	267
3	266
3	121
3	280
3	282

Clearance Times for Runway Crossing to be Completed.

RWY EXIT SELECTION

1	1	4							
287	0.10	302	0.20	329	0.20	255	0.50		
2	1	6							
290	0.02	259	0.04	287	0.28	302	0.55	296	0.02
329	0.08								
3	1	6							
298	0.05	300	0.24	290	0.24	259	0.15	287	0.10
302	0.24								
4	1	2							
290	0.50	302	0.50						
1	2	2							

```
321   0.99   316   0.01
  2      2     3
270   0.30   316   0.30   321   0.40
  3      2     3
270   0.30   316   0.30   321   0.40
  4      2     3
270   0.30   316   0.30   321   0.40
  1      3     3
307   0.68   305   0.21   304   0.11
  2      3     5
266   0.05   323   0.03   284   0.09   307   0.72   305   0.11
  3      3     4
266   0.30   284   0.10   307   0.20   304   0.40
  4      3     4
266   0.30   284   0.10   307   0.20   304   0.40
KW EXIT DISTANCES
 18
287   5480   302   6230   329   7770   255   9220   290   4460
259   4720   296   1160   298   2400   300   3390   321   6880
316   4950   270   4250   307   5830   305   6880   304   8260
266   2920   323   3800   284   4770
FIX TRAVEL TIMES
  1      1     1   28.5   180.0
  1      1     2   28.5   180.0
  1      1     3   28.5   180.0
  1      1     4    —      —
  2      1     1    —      —
```

2	1	2	25.5	180.0
2	1	3	—	—
2	1	4		
3	1	1	28.5	180.0
3	1	2	—	—
3	1	3	—	—
3	1	4	—	—
4	1	1	30.0	180.0
4	1	2	30.0	180.0
4	1	3	—	—
4	1	4	—	—
1	2	1	—	—
1	2	2	28.5	180.0
1	2	3	—	—
1	2	4	—	—
2	2	1	28.5	180.0
2	2	2	28.5	180.0
2	2	3	—	—
2	2	4	—	—
3	2	1	—	—
3	2	2	42.0	180.0
3	2	3	—	—
3	2	4	—	—
4	2	1	31.5	180.0
4	2	2	—	—
4	2	3	—	—
4	2	4	—	—

2	3	1	27.0	202.5
2	3	2	27.0	202.5
2	3	3	27.0	180.0
2	3	4	—	—
3	3	1	31.5	198.9
3	3	2	31.5	180.0
3	3	3	—	—
3	3	4	—	—
4	3	1	28.5	180.0
4	3	2	28.5	180.0
4	3	3	—	—
-4	3	4	—	—

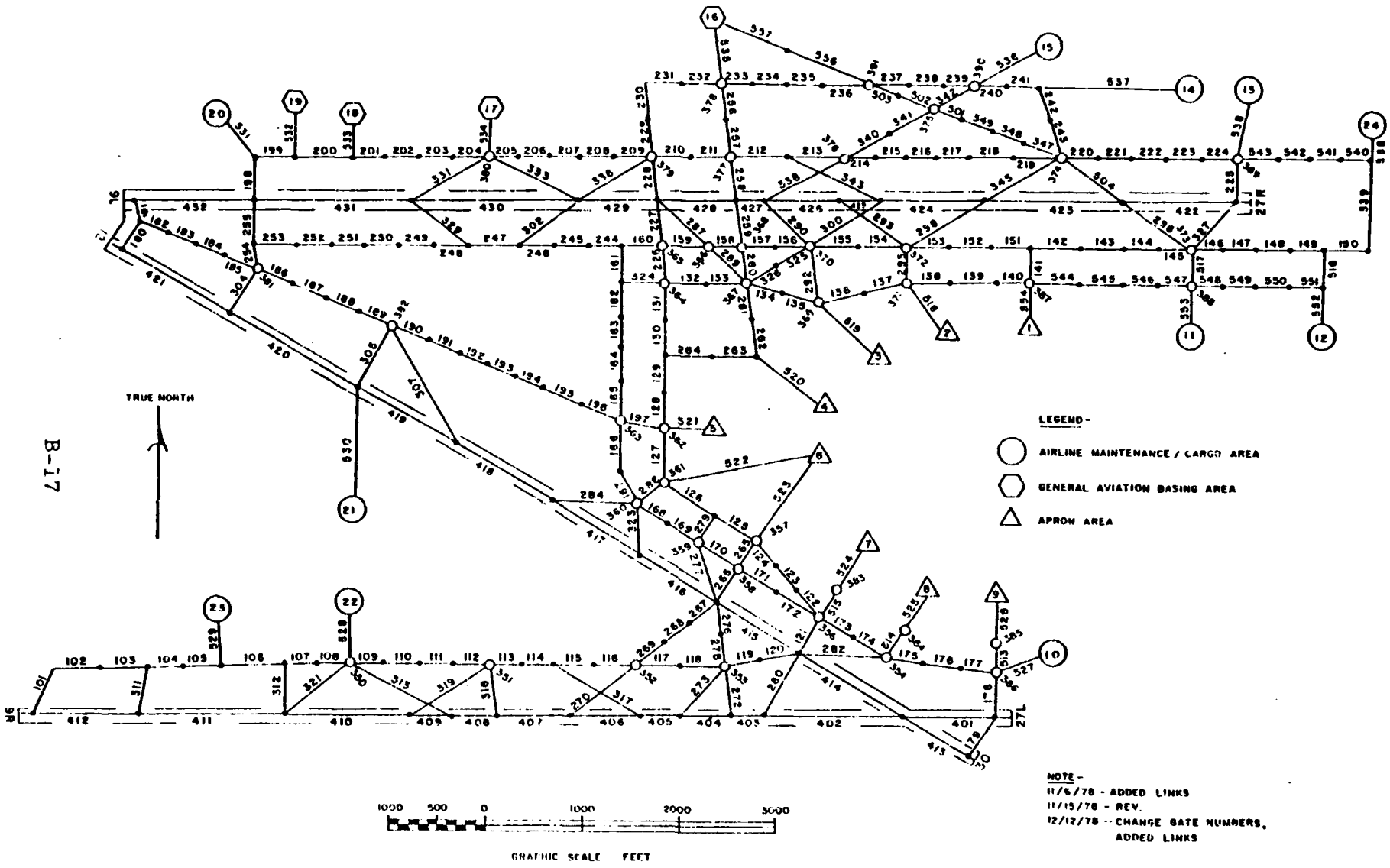

FIGURE 8 - MIAMI LINK-NODE DIAGRAM

AIRLINE GROUP CATEGORIES

Airlines have been coded into 12 groups for model input:

Airline Code	Category
IA	Internaticnal Airlines (Concourse E and Satellite
EA	Domestic Airlines (Concourses B and C)
DD	Domestic Airlines (Concourse D)
FF	Domestic Airlines (Concourse F)
GG	Domestic Airlines (Concourse G)
HH	Domestic Airlines (Concourse H)
C1	Air Taxi (Concourse D)
C2	Air Taxi (Concourse H)
F1	Cargo (N.W. Area)
F2	Cargo (Rich Area)
F3	Cargo (Airlift Area)
GA	General Aviation

The airlines included in each of the above groups are:

1) International Airlines (IA)

AF - Air France
AM - Air Mexico
AR - Argentinas
AV - Avianca
BA - British Airways
BN - Braniff (DCS's)
BW - British (West Indian)
ST - Belize
DO - Dominicana
EU - Ecuatoriana (Also EQ)
GU - Aviateca
IB - Iberia
JF - L. A. B. Flying Service, Inc.
JM - Air Jamaica
KQ - Cayman Air (Also KX)
LA - Lan Chile (Also LN)
LM - Alm Dutch (Antillian)
LR - Lacsa
MX - Mexicana
NI - Lanica
OD - Aero Condor

International Airlines (IA) Continued

OP - Air Panama
PA - Pan American (Clipper)
PL - Aero Peru (Peruvian)
TA - Taca
TX - Honduras (Also TAN)
VA - Viasa
RG - Varig

2) Domestic Airlines (EA)

EA - Eastern

3) Domestic Airlines (DD)

BN - Braniff (727's)
WA - Western Airlines

4) Domestic Airlines (FF)

NA - National
NC - North Central

5) Domestic Airlines (GG)

AC - Air Canada
OZ - Ozark
CO - Continental
SO - Southern
NW - (Northwest) Orient
AA - American
TW - Trans World Airlines
UA - United

6) Domestic Airlines (HH)

DL - Delta
BH - Bahamas Air

7) Air Taxi (C1)

MCS - Marco Island Airways
AAT - Air Sunshine (AMAIR)
PLM - Air Florida (PALM)
PT - Naples

8) Air Taxi (C2)

FDA - Florida Air Lines
XW - Shawnee
ORA - Ocean Reef
VW - Air Miami

9) Cargo (F1)

CC - Aerocosta
CF - Fawcett
CJ - Carib West
HJ - Air Haiti
AESA - El Salvador
KS - Saturn Airways
MM - Columbia(Also SAM)
SJ - Southern Air Transport
TD - Trans Carga

10) Cargo (F2)

IX - Panama (INAIR)
RI - (RICH) Internaticnal (Also RIA)
FDE - Federal Express
FLM - Fleming

11) Cargo (F3)

ED - Andes
AER - Argentina
TAR - Argentina
RD - (Airlift) International
FT - Flying Tiger

12) General Aviation

GA - All G. A. Aircraft

Attachment C

INPUT DATA SUMMARY
STAGE 1 EXPERIMENTS

Miami International Airport

Miami
Airport Improvement Task Force Delay Studies

January 1979

TABLE 2
MIAMI DELAY EXPERIMENTS
STAGE 1

Experiment Number	Model	Study Case[a]	Arrival Runways	Departure Runways	Weather	Demand	ATC System Scenario[b]	Near-term Improvements[c]
1	ASM[d]	1	9L, 9R, 12	9L, 9R, 12	VFR1	Todays	Todays	None
7	ASM	1	9L, 9R, 12	9L, 9R, 12	VFR1	Pre-1985	Todays	None
11	ASM	1	9L, 9R, 12	9L, 9R, 12	VFR1	Pre-1985	Pre-1985	Pre-1985[e]
14	ASM	1	9L, 9R, 12	9L, 9R, 12	VFR1	Pre-1985	Pre-1985	Pre-1985[e], 50% Less G.A.[g]
4	ASM	4	9L, 9R	9L, 9R, 12	IFR1	Todays	Todays	None
6	ASM	8	None	9L	IFR2	Todays	Todays	None
9	ASM	4	9L, 9R	9L, 9R, 12	IFR1	Pre-1985	Todays	None
10	ASM	8	None	9L	IFR2	Pre-1985	Todays	None
21	ASM	9	9L, 9R	9L, 9R, 12	IFR2	Pre-1985	Pre-1985	Pre-1985[e]
2	ASM	2	27L, 27R, 30	27L, 27R, 30	VFR1	Todays	Todays	None
8	ASM	2	27L, 27R, 30	27L, 27R, 30	VFR1	Pre-1985	Todays	None
3	ASM	3	27L, 27R	27L, 27R, 30	VFR2	Todays	Todays	None
17	ASM	3	27L, 27R	27L, 27R, 30	VFR2	Pre-1985	Todays	None
12	ASM	7	27L, 27R, 30	27L, 27R, 30	VFR2	Pre-1985	Pre-1985	Pre-1985[e]
5	ASM	5	27L, 27R	27L, 27R	IFR1	Todays	Todays	None
15	ASM	5	27L, 27R	27L, 27R	IFR1	Pre-1985	Pre-1985	Pre-1985[e]
20	ASM	5	27L, 27R	27L, 27R	IFR1	Pre-1985	Pre-1985	Pre-1985[e], 50% Less G.A.[g]

[a] Study cases are defined in Figure III-1 of the Miami International Airport Technical Plan (Oct. 1978).

[b] FAA will describe impact of pre-1985 and post-1985 ATC systems on model inputs (as per report No. FAA-EM-78-8A).

[c] Potential near-term improvements are identified in Appendix B of the Miami International Airport Technical Plan.

[d] Airfield Simulation Model

[e] Task Force will establish packages of near-term improvements most likely to be implemented in the pre-1985 and post-1985 time frames. Improvements to runways 9L/27R, 9R/27L, and 12/30 identified as improvements 1, 2, and 3 in Appendix B of the Technical Plan are most likely to be included in the pre-1985 improvements.

[g] Reduction in general aviation achieved by upgrading Opa Locka and Tamiami General Aviation Reliever Airports.

MIA
INDEX OF STAGE 1 EXPERIMENTS*

*Stage 1 experiments as revised by the Miami Delay Studies' Task Force on 12/8/78, but reorganized and grouped by similar runway configuration/weather categories.

MIA - STAGE 1

EXPERIMENT NO. 1

Objective:

To obtain baseline delay estimates for the following runway configuration in VFR1 for 1978 demand:

Arrival Runways	Departure Runways
9L, 9R, 12	9L, 9R, 12

Related Comparison Experiments:

Calibration was performed using this easterly configuration.
Inputs should be similar, but with 1978 demand.
Experiment 4 examines this configuration with IFR1 weather and 1978 demand.
Experiment 7 compares to this baseline case, wherein demand is increased to the 1983 level under VFR1 conditions.

Remaining Data Items:

- Time period to be simulated.
- 1978 demand.
- 1978 demand input distributions (arrival fix, runways, gates). (see tables 3 and 4)
- Lateness distribution (see table 5).

Experiment Number: 1 (Input changes from experiment number Config. "A")

SIMULATION MODEL INPUT	DESCRIPTION OF INPUT CHANGE
A. Logistics	
1. Title	Miami Delay Experiments - Stage 1
2. Random number seeds	
3. Start and finish times	Required from Task Force
4. Print options	
5. Airline names	
6. Processing options	
7. Truncation limits	
8. Time switch	
B. Airfield Physical Characteristics	Configuration "A" (Easterly)
9. Airfield network	
10 Number of runways	
11. Runway identification	
12. Departure runway and links	
13. Runway crossing links	
14. Exit taxiway location	
15. Holding areas	
16. Airline gates	
17. General aviation basing areas	
C. ATC Procedures	
18. Aircraft separation (See Data Package No. 1 pp. 7-8 for minimum VFR valu	
19. Route data	
20. Two-way path data	
21. Common approach paths	
22. Vectoring delays	
23. Departing runway queue control	
24. Gate hold control	
25. Departure airspace constraints	
26. Departure queue	
27. Runway crossing delay control	
D. Aircraft Operational Characteristics	
28. Exit taxiway utilization	
29. Arrival runway occupancy times	
30. Touch-and-go runway occupancy times	
31. Departure runway occupancy times	
32. Taxi speeds	
33. Approach speeds	
34. Gate service times	
35. Airspace travel times	
36. Runway crossing times	
37. Lateness distributions	Required Data from Task Force
38. Demand	1978 Demand with Demand Input Distributions (Required Data from Task Force)

TABLE 3
ARRIVAL AND DEPARTURE RUNWAY/GATE DISTRIBUTIONS*

% of Class 1: Arrival Runway/Gate Distribution

	Arrivals					
Rwy	9R	9L	12	27R	27L	30
Gate Area	(No of Arcft)	( )	( )	( )	( )	( )
1		2.2 (3)		.7 (1)		.7 (1)
2	2.2 (3)	10.5 (14)		.7 (1)		2.2 (3)
3	1.5 (2)	4.0 (5)		.7 (1)		2.2 (3)
4	1.5 (2)	5.2 (7)		.7 (1)		
5	9.0 (12)	1.5 (2)		.7 (1)		4.0 (5)
6	12.7 (17)	1.5 (2)		1.5 (2)	1.5 (2)	1.5 (2)
7	6.0 (8)					2.2 (3)
8	5.0 (6)			1.5 (2)		
9	4.0 (5)				.7 (1)	.7 (1)
10-17						
18		.7 (1)				
19		.7 (1)				.7 (1)
20		.7 (1)				

*Distributions derived from Miami field-data collection of 10/30/78 through 11/3/78.

% of Class 1: Arrival Runway/Gate Distribution

Rwy	Arrivals					
	9R	9L	12	27R	27L	30
Gate Area	(No of Arcft)	( )	( )	( )	( )	( )
21	4.0 (5)					
22	.7 (1)					
23	4.0 (5)			.7 (1)		

% of Class 2: Arrival Runway/Gate Distribution

Rwy	Arrivals					
	9R	9L	12	27R	27L	30
Gate Area	(No of Arcft)	( )	( )	( )	( )	( )
1		.2 (1)				
2	1.2 (6)	9.4 (49)		1.5 (8)		.6 (3)
3	.2 (1)	10.5 (55)	.2 (1)	2.3 (12)		1.2 (6)
4	.2 (1)	3.1 (16)		.4 (2)		1.3 (7)
5	.9 (5)	.4 (2)			.2 (1)	1.7 (9)
6	10.2 (53)	1.5 (8)	.2 (1)	1.3 (7)	.2 (1)	1.5 (8)
7	7.3 (38)	2.1 (11)		.4 (2)	.4 (2)	.9 (5)
8	7.3 (38)	.8 (4)	.4 (2)	1.5 (8)	.6 (3)	.8 (4)
9	9.2 (48)	.2 (1)	.9 (5)	1.5 (8)	.6 (3)	1.9 (10)
10-15						
16	.2 (1)	.2 (1)		.2 (1)		
17	.8 (4)	2.3 (12)		.8 (4)		.9 (5)
18	.2 (1)	3.1 (16)		.2 (1)		.6 (3)

% of Class 2: Arrival Runway/Gate Distribution

Rwy	Arrivals					
	9R	9L	12	27R	27L	30
Gate Area	(No of Arcft)	( )	( )	( )	( )	( )
19	.4 (2)	1.3 (7)				.4 (2)
20						
21	.2 (1)					
22	.6 (3)					
23	.4 (2)					

% of Class 3: Arrival Runway/Gate Distribution

Rwy	Arrivals					
	9R	9L	12	27R	27L	30
Gate Area	(No of Arcft)	( )	( )	( )	( )	( )
1						
2		.8 (1)				
3		9.1 (12)	.8 (1)	.8 (1)		
4		.8 (1)				
5		.8 (1)				
6	6.0 (8)	.8 (1)				2.3 (3)
7	.8 (1)					
8	.8 (1)					
9	6.0 (8)	2.3 (3)				2.3 (3)
10-16						
17	2.3 (3)	30.3 (40)		7.5 (10)		1.5 (2)
18	1.5 (2)	12.0 (16)		5.3 (7)		2.3 (3)
19		1.5 (2)		1.5 (2)		

% of Class 4: Arrival Runway/Gate Distribution

	Arrivals					
Rwy	9R	9L	12	27R	27L	30
Gate Area	(No of Arcft)	( )	( )	( )	( )	( )
1						
2						
3		6.7 (1)				
4-8						
9		6.7 (1)				
10-16						
17		40.0 (6)		6.7 (1)		
18		26.6 (4)		13.3 (2)		
19-23						

% of Class 1: Departure Runway/Gate Distribution

Rwy	Departures					
	9R	9L	12	27R	27L	30
Gate Area	(No of Arcft)	( )	( )	( )	( )	( )
1		1.6 (2)	.8 (1)	2.4 (3)		
2		12.0 (15)	2.4 (3)	4.0 (5)		
3		5.0 (6)		.8 (1)		
4		5.0 (6)	2.4 (3)	.8 (1)		
5	.8 (1)	8.1 (10)	.8 (1)	2.4 (3)	1.6 (2)	
6	4.0 (5)	.8 (1)	.8 (1)		2.4 (3)	
7	3.2 (4)	.8 (1)	.8 (1)		1.6 (2)	
8	5.0 (6)				1.6 (2)	
9	7.3 (9)	1.6 (2)			2.4 (3)	
10-12						
13	.8 (1)					
14-16						
17	.8 (1)	1.6 (2)				

% of Class 1: Departure Runway/Gate Distribution

Rwy	Departures					
	9R	9L	12	27R	27L	30
Gate Area	(No of Arcft)	( )	( )	( )	( )	( )
18				1.6 (2)		
19		.8 (1)	.8 (1)			
20		1.6 (2)				
21		.8 (1)	1.6 (2)	.8 (1)		
22	.8 (1)					
23	2.4 (3)	1.6 (2)			.8 (1)	

% of Class 2: Departure Runway/Gate Distribution

Rwy	Departure					
	9R	9L	12	27R	27L	30
Gate Area	(No of Acrft)	(%)	(%)	(%)	(%)	(%)
1		1.4 (6)		.2 (1)		
2		6.6 (29)	3.4 (15)	2.3 (10)		
3		10.4 (46)	3.4 (15)	2.9 (13)		
4		4.3 (19)	.9 (4)	1.8 (8)	.2 (1)	
5	.5 (2)	.9 (4)	.2 (1)	1.1 (5)	.5 (2)	
6	4.5 (20)	1.1 (5)	.2 (1)		1.8 (8)	
7	9.5 (42)	.2 (1)			1.6 (7)	
8	8.3 (37)	.2 (1)	.2 (1)		3.4 (15)	
9	13.1 (58)	.5 (2)			3.8 (17)	
10-12						
13		.2 (1)				
14		.5 (2)				
15			.2 (1)			

% of Class 2: Departure Runway/Gate Distribution

Rwy	Departures					
	9R	9L	12	27R	27L	30
Gate Area	(No of Arcft)	( )	( )	( )	( )	( )
16						
17	.2 (1)	2.9 (13)	.5 (2)	1.1 (5)		
18		1.4 (6)		.5 (2)		
19		.7 (3)				
20		.5 (2)	.2 (1)	.9 (4)		
21						
22	.2 (1)					
23	.2 (1)				.2 (1)	

% of Class 3: Departure Runway/Gate Distribution

Rwy	Departures					
	9R	9L	12	27R	27L	30
Gate Area	(No of Arcft)	( )	( )	( )	( )	( )
1						
2		.9 (1)				
3		7.0 (8)		.9 (1)		
4	.9 (1)					
5	.9 (1)					
6		1.8 (2)				
7						
8	.9 (1)					
9	12.2 (14)	1.8 (2)	1.8 (2)		3.5 (4)	
10-15						
16		1.8 (2)				
17		33.3 (38)	2.6 (3)	13.9 (16)		
18		13.1 (15)		1.8 (2)	.9 (1)	

% of Class 4: Departure Runway/Gate Distribution

Rwy	Departures					
	9R	9L	12	27R	27L	30
Gate Area	(No.of Arcft)	( )	( )	( )	( )	( )
1						
2						
3		3.2 (1)				
4		3.2 (1)				
5-8						
9	9.7 (3)					
10-16						
17		38.7 (12)		16.0 (5)		
18		12.9 (4)	3.2 (1)	9.7 (3)		
19						
20				3.2 (1)		
21-23						

TABLE 4
ARRIVAL FIX/RUNWAY DISTRIBUTIONS*

% of Class 1: Arrival Fix/Runway Distribution

RUNWAY (Rwy)	LONNI (L)	OWNER (O)	FAMIN (F)	WESTO (W)	FORT LAUDERDALE (FLL)	BISCAYNE BAY (BSY)	MIAMI (MIA)	NORTHEAST QUADRANT (NE)
9R	18.8 (12)	42.2 (27)	6.2 (4)	32.8 (21)				
9L	17.6 (6)	35.3 (12)	20.6 (7)	26.5 (9)				
12				100.0 (2)				
27R	70.0 (7)		10.0 (1)	20.0 (2)				
27L		33.3 (1)		66.7 (2)				
30		46.6 (7)	26.7 (4)	26.7 (4)				

*Distributions derived from Miami field-data collection of 10/30/78 through 11/3/78.

% of Class 2: Arrival Fix/Runway Distribution

RUNWAY (Rwy)	LONNI (L)	OWNER (O)	FAMIN (F)	WESTO (W)	FORT LAUDERDALE (FLL)	BISCAYNE BAY (BSY)	MIAMI (MIA)	NORTHEAST QUADRANT (NE)
9R	29.4 (57)	23.2 (45)	19.6 (38)	25.3 (49)	.5 (1)	1.0 (2)	1.0 (2)	
9L	43.6 (79)	11.6 (21)	3.9 (7)	38.7 (70)	1.7 (3)	.5 (1)		
12	40.0 (4)		20.0 (2)	30.0 (3)	10.0 (1)			
27R	78.0 (39)	8.0 (4)		14.0 (7)				
27L	66.6 (4)	16.7 (1)	16.7 (1)					
30		29.6 (16)	22.2 (12)	48.2 (26)				

% of Class 3: Arrival Fix/Runway Distribution

RUNWAY (Rwy)	LONNI (L)	OWNER (O)	FAMIN (F)	WESTO (W)	FORT LAUDERDALE (FLL)	BISCAYNE BAY (BSY)	MIAMI (MIA)	NORTHEAST QUADRANT (NE)
9R		12.5 (1)	62.5 (5)	12.5 (1)		12.5 (1)		
9L	25.4 (15)	15.2 (9)		44.1 (26)	1.7 (1)		5.1 (3)	8.5 (5)
12								
27R	100.0 (3)							
27L								
30		100.0 (2)						

% of Class 4: Arrival Fix/Runway Distribution

RUNWAY (Rwy)	LONNI (L)	OWNER (O)	FAMIN (F)	WESTO (W)	FORT LAUDERDALE (FLL)	BISCAYNE BAY (BSY)	MIAMI (MIA)	NORTHEAST QUADRANT (NE)
9R						100.0 (1)		
9L	11.1 (1)			66.7 (6)			11.1 (1)	11.1 (1)
12								
27R								
27L								
30								

Table 5

ARRIVAL AIRCRAFT LATENESS DISTRIBUTION
(Average deviation from schedule, excluding delays due to destination airport)

Amount of time late or early	Percent of flights late or early (%)
More than 15 min. early	0
less than 15 min. early	5
On time	24
less than 5 minutes late	29
5 to 10 minutes late	15
10 to 15 minutes late	9
15 to 30 minutes late	9
30 to 45 minutes late	4
45 to 60 minutes late	2
more than 60 minutes late	3

Source: Peat, Marwick, Mitchell & Co., analysis of data provided by Stapleton Task Force

MIA - STAGE 1

EXPERIMENT NO. 7

Objective:

To assess the delay impact to aircraft in 1983 for the following runway configuration under VFR1 conditions, assuming no airport or ATC system improvements have been implemented:

ARRIVAL RUNWAYS	DEPARTURE RUNWAYS
9L, 9R, 12	9L, 9R, 12

Related Comparison Experiments:

Prior experiment 1 serves as the 1978 demand level baseline for comparison to this experiment.
Experiment 11 assesses the delays that accrue after adding near-term airport and ATC system improvements to this study case.

Remaining Data Items:

- 1983 demand
- 1983 demand input distributions (arrival fix, runways, gates)

Experiment Number: 7 (Input changes from experiment number 1)

SIMULATION MODEL INPUT	DESCRIPTION OF INPUT CHANGE
A. Logistics	
1. Title	
2. Random number seeds	
3. Start and finish times	
4. Print options	
5. Airline names	
6. Processing options	
7. Truncation limits	
8. Time switch	
B. Airfield Physical Characteristics	Configuration "A" (Easterly)
9. Airfield network	
10. Number of runways	
11. Runway identification	
12. Departure runway and links	
13. Runway crossing links	
14. Exit taxiway location	
15. Holding areas	
16. Airline gates	
17. General aviation basing areas	
C. ATC Procedures	
18. Aircraft separation	
19. Route data	
20. Two-way path data	
21. Common approach paths	
22. Vectoring delays	
23. Departing runway queue control	
24. Gate hold control	
25. Departure airspace constraints	
26. Departure queue	
27. Runway crossing delay control	
D. Aircraft Operational Characteristics	
28. Exit taxiway utilization	
29. Arrival runway occupancy times	
30. Touch-and-go runway occupancy times	
31. Departure runway occupancy times	
32. Taxi speeds	
33. Approach speeds	
34. Gate service times	
35. Airspace travel times	
36. Runway crossing times	
37. Lateness distributions	
38. Demand	1983 Demand with Demand Input Distributions (Required Data From Task Force)

MIA - STAGE 1

EXPERIMENT NO. 11

Objective:

To assess delays to aircraft in 1983 for the following runway configuration under VFR1 conditions, assuming the Miami near-term airport improvements and the improved (pre-1985) ATC system scenario:

ARRIVAL RUNWAYS	DEPARTURE RUNWAYS
9L, 9R, 12	9L, 9R, 12

Related Comparison Experiments:

Prior experiment 7 serves as the 1983 demand level baseline for comparison to this experiment.
Experiment 14 assesses the delays that accrue after reducing the G. A. traffic of this study case by 50 percent.

Remaining Data Items:

- Near-term improvements to runways 9L, 9R, and 12, as described on pages B-1 through B-8 of the Miami International Airport Improvement Program Technical Plan (October 1978).
- Pre-1985 VFR separation values.
- Route data and exit taxiway utilization for 9L improvements.

Experiment Number: 11 (Input changes from experiment number 7)

SIMULATION MODEL INPUT	DESCRIPTION OF INPUT CHANGE
A. Logistics	
1. Title	
2. Random number seeds	
3. Start and finish times	
4. Print options	
5. Airline names	
6. Processing options	
7. Truncation limits	
8. Time switch	
B. Airfield Physical Characteristics	Configuration "A" (Easterly)
9. Airfield network	
10 Number of runways	
11. Runway identification	
12. Departure runway and links	
13. Runway crossing links	
14. Exit taxiway location	
15. Holding areas	
16. Airline gates	
17. General aviation basing areas	
C. ATC Procedures	
18. Aircraft separation	Pre-1985 VFR Separation Values
19. Route data	Improvement #1
20. Two-way path data	
21. Common approach paths	
22. Vectoring delays	
23. Departing runway queue control	
24. Gate hold control	
25. Departure airspace constraints	
26. Departure queue	
27. Runway crossing delay control	
D. Aircraft Operational Characteristics	
28. Exit taxiway utilization	Improvement #1
29. Arrival runway occupancy times	
30. Touch-and-go runway occupancy times	
31. Departure runway occupancy times	
32. Taxi speeds	
33. Approach speeds	
34. Gate service times	
35. Airspace travel times	
36. Runway crossing times	
37. Lateness distributions	
38. Demand	Improvement #3 Lifts Restriction on B747 Takeoff from Runway 12

TABLE 6
PRE-1985 VFR SEPARATION VALUES*

A. Arrival-Arrival Separation (nmi) - VFR - Without Buffer

		Trail Aircraft Class			
		A	B	C	D
Lead Aircraft Class	A	1.9	1.9	1.9	1.9
	B	1.9	1.9	1.9	1.9
	C	2.7	2.7	1.9	1.9
	D	4.0	4.0	3.0	2.7

B. Departure-Departure Separations (seconds) - VFR

		Trail Aircraft Class			
		A	B	C	D
Lead Aircraft Class	A	35	35	45	50
	B	35	35	45	50
	C	50	50	60	60
	D	120	120	120	90

TABLE 6 - Continued

C. Departure-Arrival Separation (nmi) - VFR

		Trail Aircraft Class			
		A	B	C	D
Lead Aircraft Class	A	1.35	1.35	1.35	1.35
	B	1.35	1.35	1.35	1.35
	C	1.65	1.65	1.65	1.65
	D	1.77	1.77	1.77	1.77

D. Arrival-Departure Separation (seconds) - VFR

		Trail Aircraft Class			
		A	B	C	D
Lead Aircraft Class	A	48	48	48	48
	B	46	46	46	46
	C	52	52	52	52
	D	56	56	56	56

*The separations shown are minimum values. Simultaneous use of runways 9R/12 will be affected by setting their arrival/departure dependencies to zero (Unless changed by Task Force discussion).

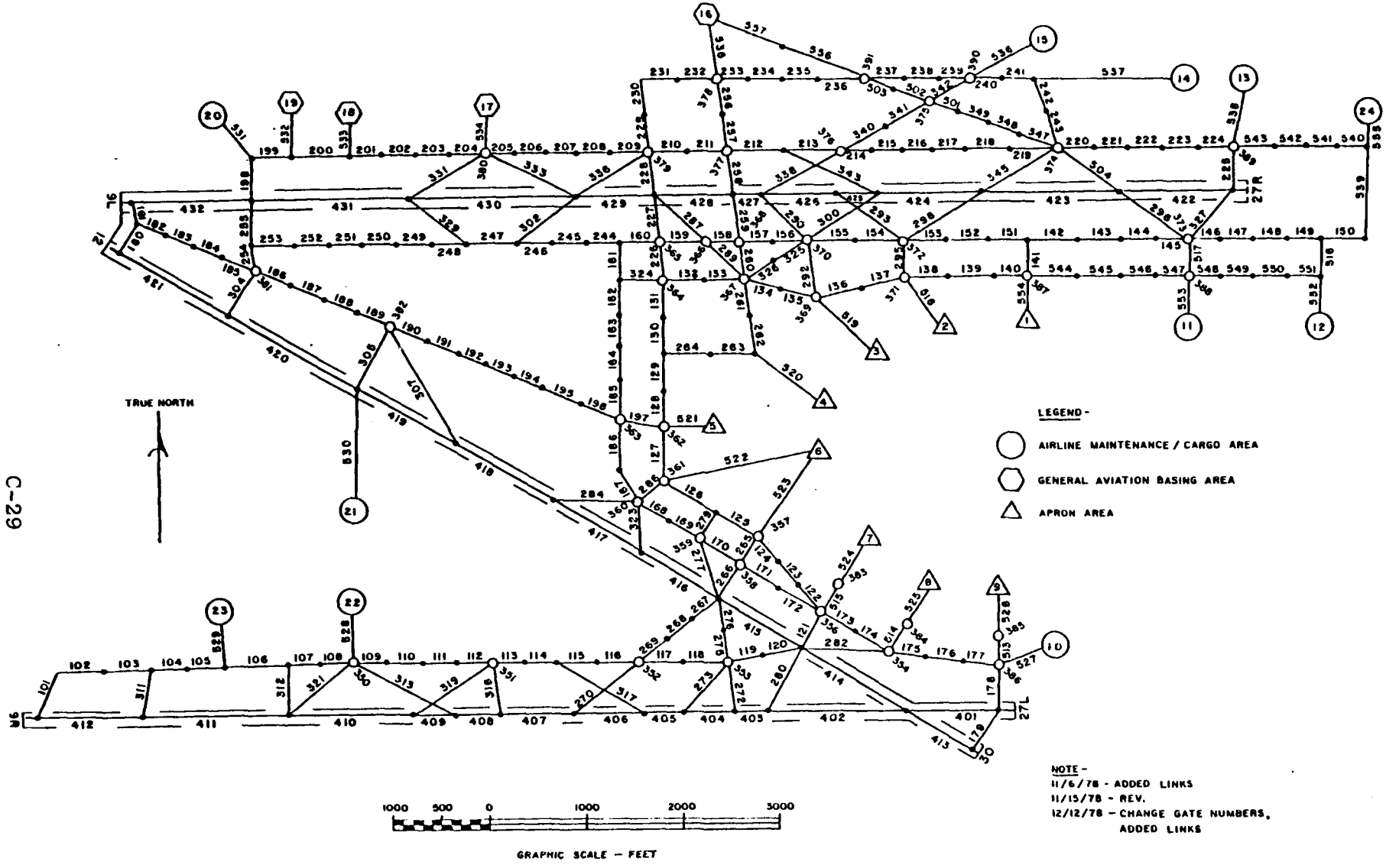

FIGURE 9 - EASTERLY CONFIGURATION IMPROVEMENT WORKSHEET

MIA - STAGE 1

EXPERIMENT NO. 14

Objective:
To assess delays to aircraft in 1983 for the following runway configuration under VFR1 conditions, assuming that the upgrading of Opa Locka and Tamiami reliever airports has affected a 50-percent reduction in G. A. traffic at Miami.

ARRIVAL RUNWAYS	DEPARTURE RUNWAYS
9L, 9R, 12	9L, 9R, 12

Related Comparison Experiments:
Prior experiment 11 serves as the baseline for comparison to this experiment, wherein the conditions of this study case were identical except for the 50-percent reduction in G. A. traffic at Miami.

Remaining Data Items:

- General Aviation demand reductions for Class 1 (D), Class 2 (C), Class 3 (B), and Class 4 (A).
  (Total 50-percent Reduction in General Aviation)

Experiment Number: 14 (Input changes from experiment number 11)

SIMULATION MODEL INPUT	DESCRIPTION OF INPUT CHANGE
A. Logistics	
1. Title	
2. Random number seeds	
3. Start and finish times	
4. Print options	
5. Airline names	
6. Processing options	
7. Truncation limits	
8. Time switch	
B. Airfield Physical Characteristics	Configuration "A" (Easterly)
9. Airfield network	
10 Number of runways	
11. Runway identification	
12. Departure runway and links	
13. Runway crossing links	
14. Exit taxiway location	
15. Holding areas	
15. Airline gates	
17. General aviation basing areas	
C. ATC Procedures	
18. Aircraft separation	
19. Route data	
20. Two-way path data	
21. Common approach paths	
22. Vectoring delays	
23. Departing runway queue control	
24. Gate hold control	
25. Departure airspace constraints	
26. Departure queue	
27. Runway crossing delay control	
D. Aircraft Operational Characteristics	
28. Exit taxiway utilization	
29. Arrival runway occupancy times	
30. Touch-and-go runway occupancy times	
31. Departure runway occupancy times	
32. Taxi speeds	
33. Approach speeds	
34. Gate service times	
35. Airspace travel times	
36. Runway crossing times	
37. Lateness distributions	
38. Demand	50% Less General Aviation

MIA - STAGE 1

EXPERIMENT NO. 4

Objective:

To obtain baseline delay estimates for the following runway configuration in IFR1 for 1978 demand:

ARRIVAL RUNWAYS	DEPARTURE RUNWAYS
9L, 9R	9L, 9R, 12

Related Comparison Experiments:

Prior experiment 1 examines this configuration with VFR1 weather and 1978 demand.
Experiment 6 assesses the delay impact of moving from IFR1 to IFR2 conditions.
Experiment 9 also compares to this study case, wherein demand is increased to the 1983 level under IFR1 conditions.

Remaining Data Items:

- 1978 IFR separation values
- 1978 demand input distributions (Runway 12 arrivals in experiment 1 redistributed to runways 9L and 9R).
- Arrival runway occupancy times (from capacity study): Delay study VFR1 values + 5 seconds.

Experiment Number: 4 (Input changes from experiment number 1)

SIMULATION MODEL INPUT	DESCRIPTION OF INPUT CHANGE
A. Logistics	
1. Title	
2. Random number seeds	
3. Start and finish times	
4. Print options	
5. Airline names	
6. Processing options	
7. Truncation limits	
8. Time switch	
B. Airfield Physical Characteristics	Configuration "A" (Easterly)
9. Airfield network	
10 Number of runways	
11. Runway identification	
12. Departure runway and links	
13. Runway crossing links	
14. Exit taxiway location	
15. Holding areas	
16. Airline gates	
17. General aviation basing areas	
C. ATC Procedures	
18. Aircraft separation	1978 IFR Separation Values
19. Route data	
20. Two-way path data	
21. Common approach paths	
22. Vectoring delays	
23. Departing runway queue control	
24. Gate hold control	
25. Departure airspace constraints	
26. Departure queue	
27. Runway crossing delay control	
D. Aircraft Operational Characteristics	
28. Exit taxiway utilization	
29. Arrival runway occupancy times	IFR1 Weather Conditions: VFR + 5 sec
30. Touch-and-go runway occupancy times	
31. Departure runway occupancy times	
32. Taxi speeds	
33. Approach speeds	
34. Gate service times	
35. Airspace travel times	
36. Runway crossing times	
37. Lateness distributions	
38. Demand	Demand Input Distribution(Arrivals on Runway 12 Redistributed to 9L and 9R)

TABLE 7
1978 IFR SEPARATION VALUES*

A. Arrival-Arrival Separation (nmi) - IFR - Without Buffer

		Trail Aircraft Class			
		A	B	C	D
Lead Aircraft Class	A	3.0	3.0	3.0	3.0
	B	3.0	3.0	3.0	3.0
	C	4.0	4.0	3.0	3.0
	D	6.0	6.0	5.0	4.0

B. Departure-Departure Separation (seconds) - IFR

		Trail Aircraft Class			
		A	B	C	D
Lead Aircraft Class	A	60	60	60	60
	B	60	60	60	60
	C	60	60	60	60
	D	120	120	120	90

TABLE 7 - Continued

C. Departure-Arrival Separation (nmi) - IFR

		Trail Aircraft Class			
		A	B	C	D
Lead Aircraft Class	A	1.85	1.85	1.85	1.85
	B	1.85	1.85	1.85	1.85
	C	2.15	2.15	2.15	2.15
	D	2.27	2.27	2.27	2.27

D. Arrival-Departure Separation (seconds) - IFR

		Trail Aircraft Class			
		A	B	C	D
Lead Aircraft Class	A	53	53	53	53
	B	51	51	51	51
	C	57	57	57	57
	D	61	61	61	61

*The separations shown are minimum values.
Departure/Arrival separations assume VFR values + 0.5 nmi.
Arrival/Departure separations assume IFR runway occupancy time equals VFR runway occupancy time + 5 seconds.

MIA - STAGE 1

EXPERIMENT NO. 6

Objective:

To assess the delay impact to aircraft in 1978 for the following runway configuration under IFR2 conditions (This experiment also establishes baseline delay estimates for comparison to experiment 10):

ARRIVAL RUNWAYS	DEPARTURE RUNWAYS
None	9L

Related Comparison Experiments:

Prior experiment 4 examines this configuration with IFR1 weather and 1978 demand.
Experiment 10 also compares to this study case, wherein demand is increased to the 1983 level under IFR2 conditions.

Remaining Data Items:

- It is suggested that an IFR1/IFR2/IFR1 situation be used for this experiment, with the IFR2 conditions lasting for only a short time (e.g., one-half hour). This will enable the recovery of the airport from the IFR2 deterioration to be studied.

Experiment Number: 6 (Input changes from experiment number 4)

SIMULATION MODEL INPUT	DESCRIPTION OF INPUT CHANGE
A. Logistics	
1. Title	
2. Random number seeds	
3. Start and finish times	
4. Print options	
5. Airline names	
6. Processing options	
7. Truncation limits	
8. Time switch	
B. Airfield Physical Characteristics	Configuration "A" (Easterly)
9. Airfield network	
10 Number of runways	
11. Runway identification	
12. Departure runway and links	
13. Runway crossing links	
14. Exit taxiway location	
15. Holding areas	
16. Airline gates	
17. General aviation basing areas	
C. ATC Procedures	
18. Aircraft separation	
19. Route data	
20. Two-way path data	
21. Common approach paths	
22. Vectoring delays	
23. Departing runway queue control	
24. Gate hold control	
25. Departure airspace constraints	
26. Departure queue	
27. Runway crossing delay control	
D. Aircraft Operational Characteristics	
28. Exit taxiway utilization	
29. Arrival runway occupancy times	
30. Touch-and-go runway occupancy times	
31. Departure runway occupancy times	
32. Taxi speeds	
33. Approach speeds	
34. Gate service times	
35 Airspace travel times	
36. Runway crossing times	
37. Lateness distributions	
38. Demand	Only Departures on 9L During Period of IFR2 Conditions

MIA - STAGE 1

EXPERIMENT NO. 9

Objective:
To assess the delay impact to aircraft in 1983 for the following runway configuration under IFR1 conditions, assuming no airport or ATC system improvements have been implemented:

ARRIVAL RUNWAYS	DEPARTURE RUNWAYS
9L, 9R	9L, 9R, 12

Related Comparison Experiments:
Prior experiment 4 serves as the 1978 demand level baseline for comparison to this experiment.
Experiment 10 assess the delay impact of moving from IFR1 to IFR2 conditions under 1983 demand.

Remaining Data Items:

- 1983 demand.
- 1983 demand input distributions.

Experiment Number: 9 (Input changes from experiment number 4)

SIMULATION MODEL INPUT	DESCRIPTION OF INPUT CHANGE
A. Logistics	
1. Title	
2. Random number seeds	
3. Start and finish times	
4. Print options	
5. Airline names	
6. Processing options	
7. Truncation limits	
8. Time switch	
B. Airfield Physical Characteristics	Configuration "A" (Eastonly)
9. Airfield network	
10 Number of runways	
11. Runway identification	
12. Departure runway and links	
13. Runway crossing links	
14. Exit taxiway location	
15. Holding areas	
16. Airline gates	
17. General aviation basing areas	
C. ATC Procedures	
18. Aircraft separation	
19. Route data	
20. Two-way path data	
21. Common approach paths	
22. Vectoring delays	
23. Departing runway queue control	
24. Gate hold control	
25. Departure airspace constraints	
26. Departure queue	
27. Runway crossing delay control	
D. Aircraft Operational Characteristics	
28. Exit taxiway utilization	
29. Arrival runway occupancy times	
30. Touch-and-go runway occupancy times	
31. Departure runway occupancy times	
32. Taxi speeds	
33. Approach speeds	
34. Gate service times	
35 Airspace travel times	
36. Runway crossing times	
37. Lateness distributions	
38. Demand	1983 Demand and Demand Input Distributions

MIA - STAGE 1

EXPERIMENT NO. 10

Objective:

To assess the delay impact to aircraft in 1983 for the following runway configuration under IFR2 conditions, assuming no airport or ATC system improvements have been implemented:

ARRIVAL RUNWAYS	DEPARTURE RUNWAYS
None	9L

Related Comparison Experiments:

Prior experiment 6 serves as the 1978 demand level baseline for comparison to this experiment.
Prior experiment 9 examines this configuration with IFR1 weather and 1983 demand.
Experiment 21 assesses the delays that accrue after adding near-term airport and ATC system improvements to this study case.

Remaining Data Items:

- It is suggested that the same IFR1/IFR2/IFR1 situation used in experiment 6 be used in this experiment. This will allow the recovery from the IFR2 deterioration to be compared between experiments 6 and 10.
- 1983 demand.
- 1983 demand input distributions.

Experiment Number: 10 (Input changes from experiment number 6)

SIMULATION MODEL INPUT	DESCRIPTION OF INPUT CHANGE
A. Logistics	
1. Title	
2. Random number seeds	
3. Start and finish times	
4. Print options	
5. Airline names	
6. Processing options	
7. Truncation limits	
8. Time switch	
B. Airfield Physical Characteristics	Configuration "A" (Easterly)
9. Airfield network	
10 Number of runways	
11. Runway identification	
12. Departure runway and links	
13. Runway crossing links	
14. Exit taxiway location	
15. Holding areas	
16. Airline gates	
17. General aviation basing areas	
C. ATC Procedures	
18. Aircraft separation	
19. Route data	
20. Two-way path data	
21. Common approach paths	
22. Vectoring delays	
23. Departing runway queue control	
24. Gate hold control	
25. Departure airspace constraints	
26. Departure queue	
27. Runway crossing delay control	
D. Aircraft Operational Characteristics	
28. Exit taxiway utilization	
29. Arrival runway occupancy times	
30. Touch-and-go runway occupancy times	
31. Departure runway occupancy times	
32. Taxi speeds	
33. Approach speeds	
34. Gate service times	
35. Airspace travel times	
36. Runway crossing times	
37. Lateness distributions	
38. Demand	Only Departures on 9L During Period of IFR2 Conditions.

MIA - STAGE 1

EXPERIMENT NO. 21

Objective:
To assess delays to aircraft in 1983 for the following runway configuration under IFR2 conditions, assuming the Miami near-term airport improvements and the improved (pre-1985) ATC system scenario:

ARRIVAL RUNWAYS	DEPARTURE RUNWAYS
9L, 9R	9L, 9R, 12

Related Comparison Experiments:
Prior experiment 10 serves as the 1983 demand level baseline for comparison to this experiment. This experiment assumes that the near-term airport improvements have enabled arrivals on 9L/9R and departures on 9L/9R/12 to be operated in IFR2 conditions.

Remaining Data Items:

- Near-term improvements to runways 9L, 9R, and 12, as described on pages B-1 through B-8 of the Miami International Airport Improvement Program Technical Plan.
- Pre-1985 IFR separation values.
- Route data and exit taxiway utilization for 9L improvements.

Experiment Number: 21 (Input changes from experiment number 9)

SIMULATION MODEL INPUT	DESCRIPTION OF INPUT CHANGE
A. Logistics	
1. Title	
2. Random number seeds	
3. Start and finish times	
4. Print options	
5. Airline names	
6. Processing options	
7. Truncation limits	
8. Time switch	
B. Airfield Physical Characteristics	Configuration "A" (Easterly)
9. Airfield network	
10 Number of runways	
11. Runway identification	
12. Departure runway and links	
13. Runway crossing links	
14. Exit taxiway location	
15. Holding areas	
16. Airline gates	
17. General aviation basing areas	
C. ATC Procedures	
18. Aircraft separation	Pre-1985 IFR Separation Values
19. Route data	Improvement #1
20. Two-way path data	
21. Common approach paths	
22. Vectoring delays	
23. Departing runway queue control	
24. Gate hold control	
25. Departure airspace constraints	
26. Departure queue	
27. Runway crossing delay control	
D. Aircraft Operational Characteristics	
28. Exit taxiway utilization	Improvement #1
29. Arrival runway occupancy times	
30. Touch-and-go runway occupancy times	
31. Departure runway occupancy times	
32. Taxi speeds	
33. Approach speeds	
34. Gate service times	
35. Airspace travel times	
36. Runway crossing times	
37. Lateness distributions	
38. Demand	Improvement #3 Lifts Restrictions on B747 Takeoff from Runway 12

TABLE 8
PRE-1985 IFR SEPARATION VALUES*

A. Arrival-Arrival Separation (nmi) - IFR - Without Buffer

		Trail Aircraft Class			
		A	B	C	D
Lead Aircraft Class	A	3.0	3.0	3.0	3.0
	B	3.0	3.0	3.0	3.0
	C	3.0	3.0	3.0	3.0
	D	4.0	4.0	3.0	3.0

B. Departure-Departure Separation (seconds) - IFR

		Trail Aircraft Class			
		A	B	C	D
Lead Aircraft Class	A	60	60	60	60
	B	60	60	60	60
	C	60	60	60	60
	D	120	120	120	90

TABLE 8 - Continued

C. Departure-Arrival Separation (nmi) - IFR

		Trail Aircraft Class			
		A	B	C	D
Lead Aircraft Class	A	1.85	1.85	1.85	1.85
	B	1.85	1.85	1.85	1.85
	C	2.15	2.15	2.15	2.15
	D	2.27	2.27	2.27	2.27

D. Arrival-Departure Separation (seconds) - IFR

		Trail Aircraft Class			
		A	B	C	D
Lead Aircraft Class	A	53	53	53	53
	B	51	51	51	51
	C	57	57	57	57
	D	61	61	61	61

*The separations are minimum values.
Departure/Arrival separations assume VFR values + 0.5 nmi.
Arrival/Departure separations assume IFR runway occupancy time equals VFR runway occupancy time + 5 seconds.

Simultaneous use of runways 9R/12 will be affected by setting the 9R arrival/12 departure dependency to zero (Unless changed by Task Force Discussion).

MIA - STAGE 1

EXPERIMENT NO. 2

Objective:

To obtain baseline delay estimates for the following runway configuration in VFR1 for 1978 demand:

ARRIVAL RUNWAYS	DEPARTURE RUNWAYS
27L, 27R, 30	27L, 27R, 30

Related Comparison Experiments:

Experiment 5 examines this westerly configuration with IFR1 weather and 1978 demand.
Experiment 3 assesses the delay impact of VFR2 conditions and 1978 demand.
Experiment 8 compares to this baseline case, wherein demand is increased to the 1983 level under VFR1 conditions.

Remaining Data Items:

- Time period to be simulated.
- 1978 demand.
- 1978 demand input distributions.

Experiment Number: 2 (Input changes from experiment number Configuration "B")

SIMULATION MODEL INPUT	DESCRIPTION OF INPUT CHANGE
A. Logistics	
1. Title	
2. Random number seeds	
3. Start and finish times	Required from Task Force
4. Print options	
5. Airline names	
6. Processing options	
7. Truncation limits	
8. Time switch	
B. Airfield Physical Characteristics	Configuration "B" (Westerly)
9. Airfield network	
10 Number of runways	
11. Runway identification	
12. Departure runway and links	
13. Runway crossing links	
14. Exit taxiway location	
15. Holding areas	
16. Airline gates	
17. General aviation basing areas	
C. ATC Procedures	
18. Aircraft separation	
19. Route data	
20. Two-way path data	
21. Common approach paths	
22. Vectoring delays	
23. Departing runway queue control	
24. Gate hold control	
25. Departure airspace constraints	
26. Departure queue	
27. Runway crossing delay control	
D. Aircraft Operational Characteristics	
28. Exit taxiway utilization	
29. Arrival runway occupancy times	
30. Touch-and-go runway occupancy times	
31. Departure runway occupancy times	
32. Taxi speeds	
33. Approach speeds	
34. Gate service times	
35. Airspace travel times	
36. Runway crossing times	
37. Lateness distributions	
38. Demand	1978 Demand and Demand Input Distributions (Required from Task Force)

MIA - STAGE 1

EXPERIMENT NO. 8

Objective:

To assess the delay impact to aircraft in 1983 for the following runway configuration under VFR1 conditions, assuming no airport or ATC system improvements have been implemented:

ARRIVAL RUNWAYS	DEPARTURE RUNWAYS
27L, 27R, 30	27L, 27R, 30

Related Comparison Experiments:

Prior experiment 2 serves as the 1978 demand level baseline for comparison to this experiment.
Experiment 17 assesses the delay impact of VFR2 conditions and 1978 demand.

Remaining Data Items:

- 1983 demand.
- 1983 demand input distributions.

Experiment Number: 8 (Input changes from experiment number 2)

SIMULATION MODEL INPUT	DESCRIPTION OF INPUT CHANGE
A. Logistics	
1. Title	
2. Random number seeds	
3. Start and finish times	
4. Print options	
5. Airline names	
6. Processing options	
7. Truncation limits	
8. Time switch	
B. Airfield Physical Characteristics	Configuration "B" (Westerly)
9. Airfield network	
10 Number of runways	
11. Runway identification	
12. Departure runway and links	
13. Runway crossing links	
14. Exit taxiway location	
15. Holding areas	
16. Airline gates	
17. General aviation basing areas	
C. ATC Procedures	
18. Aircraft separation	
19. Route data	
20. Two-way path data	
21. Common approach paths	
22. Vectoring delays	
23. Departing runway queue control	
24. Gate hold control	
25. Departure airspace constraints	
26. Departure queue	
27. Runway crossing delay control	
D. Aircraft Operational Characteristics	
28. Exit taxiway utilization	
29. Arrival runway occupancy times	
30. Touch-and-go runway occupancy times	
31. Departure runway occupancy times	
32. Taxi speeds	
33. Approach speeds	
34. Gate service times	
35 Airspace travel times	
36. Runway crossing times	
37. Lateness distributions	
38. Demand	1983 Demand and Demand Input Distributions

MIA - STAGE 1

EXPERIMENT NO. 3

Objective:
To assess the delay impact to aircraft in 1978 for the following runway configuration under VFR2 conditions (This experiment also establishes baseline delay estimates for comparison to experiment 17):

ARRIVAL RUNWAYS	DEPARTURE RUNWAYS
27L, 27R	27L, 27R, 30

Related Comparison Experiments:
Prior experiment 2 examines this configuration with VFR1 weather and 1978 demand.
Experiment 17 also compares to this study case, wherein demand is increased to the 1983 level under VFR2 conditions.

Remaining Data Items:

- Arrivals to runway 30 not conducted under 1978 VFR2 conditions.
- Demand input distributions (arrivals to runway 30 redistributed to 27L, 27R).

Experiment Number: 3 (Input changes from experiment number 2)

SIMULATION MODEL INPUT	DESCRIPTION OF INPUT CHANGE
A. Logistics	
1. Title	
2. Random number seeds	
3. Start and finish times	
4. Print options	
5. Airline names	
6. Processing options	
7. Truncation limits	
8. Time switch	
B. Airfield Physical Characteristics	
9. Airfield network	
10 Number of runways	
11. Runway identification	
12. Departure runway and links	
13. Runway crossing links	
14. Exit taxiway location	
15. Holding areas	
16. Airline gates	
17. General aviation basing areas	
C. ATC Procedures	
18. Aircraft separation	
19. Route data	
20. Two-way path data	
21. Common approach paths	
22. Vectoring delays	
23. Departing runway queue control	
24. Gate hold control	
25. Departure airspace constraints	
26. Departure queue	
27. Runway crossing delay control	
D. Aircraft Operational Characteristics	
28. Exit taxiway utilization	
29. Arrival runway occupancy times	
30. Touch-and-go runway occupancy times	
31. Departure runway occupancy times	
32. Taxi speeds	
33 Approach speeds	
34 Gate service times	
35 Airspace travel times	
36 Runway crossing times	
Access distributions	
[illegible]	Demand Input Distribution (Arrivals on Runway 30 Redistributed to 27L and 27

MIA - STAGE 1

EXPERIMENT NO. 17

Objective:
To assess the delay impact to aircraft in 1983 for the following runway configuration under VFR2 conditions, assuming no airport or ATC system improvements have been implemented:

ARRIVAL RUNWAYS	DEPARTURE RUNWAYS
27L, 27R	27L, 27R, 30

Related Comparison Experiments:
Prior experiment 3 serves as the 1978 demand level baseline for comparison to this experiment.
Prior experiment 8 examines this configuration with VFR1 weather and 1983 demand.
Experiment 12 assesses the delays that accrue after adding near-term airport and ATC system improvements to this study case.

Remaining Data Items:

- 1983 demand.
- 1983 demand input distributions.

Experiment Number: 17 (Input changes from experiment number 3)

SIMULATION MODEL INPUT	DESCRIPTION OF INPUT CHANGE
A. Logistics	
1. Title	
2. Random number seeds	
3. Start and finish times	
4. Print options	
5. Airline names	
6. Processing options	
7. Truncation limits	
8. Time switch	
B. Airfield Physical Characteristics	Configuration "B" (Westerly)
9. Airfield network	
10 Number of runways	
11. Runway identification	
12. Departure runway and links	
13. Runway crossing links	
14. Exit taxiway location	
15. Holding areas	
16. Airline gates	
17. General aviation basing areas	
C. ATC Procedures	
18. Aircraft separation	
19. Route data	
20. Two-way path data	
21. Common approach paths	
22. Vectoring delays	
23. Departing runway queue control	
24. Gate hold control	
25. Departure airspace constraints	
26. Departure queue	
27. Runway crossing delay control	
D. Aircraft Operational Characteristics	
28. Exit taxiway utilization	
29. Arrival runway occupancy times	
30. Touch-and-go runway occupancy times	
31. Departure runway occupancy times	
32. Taxi speeds	
33. Approach speeds	
34. Gate service times	
35. Airspace travel times	
36. Runway crossing times	
37. Lateness distributions	
38. Demand	1983 Demand and Demand Input Distributions (Required from Task Force)

MIA - STAGE 1

EXPERIMENT NO. 12

Objective:

To assess delays to aircraft in 1983 for the following runway configuration under VFR2 conditions, assuming the Miami near-term airport improvements and the improved (pre-1985) ATC system scenario:

ARRIVAL RUNWAYS	DEPARTURE RUNWAYS
27L, 27R, 30	27L, 27R, 30

Related Comparison Experiments:

Prior experiment 17 serves as the 1983 demand level baseline for comparison to this experiment. This experiment assumes that improvement item no. 3 has enabled runway 30 arrivals to be conducted under VFR2 conditions.

Remaining Data Items:

- Near-term improvements to runways 27L, 27R, and 30, as described on pages B-1 through B-8 of the Miami International Airport Improvement Program Technical Plan (October 1978).
- 1983 Demand input distribution: Arrivals on runway 30 permitted under VFR2 due to near-term improvements, assuming waiver on visual separations is granted; short takeoff on runway 30 accommodated by runway 30A in the model.
- Route data and exit taxiway utilization for 27R improvements.

Experiment Number: 12 (Input changes from experiment number 17)

SIMULATION MODEL INPUT	DESCRIPTION OF INPUT CHANGE
A. Logistics	
1. Title	
2. Random number seeds	
3. Start and finish times	
4. Print options	
5. Airline names	
6. Processing options	
7. Truncation limits	
8. Time switch	
B. Airfield Physical Characteristics	Configuration "B" (Westerly)
9. Airfield network	
10 Number of runways	
11. Runway identification	Additional Runway 30A to accommodate short takeoff, Improvement #3
12. Departure runway and links	
13. Runway crossing links	
14. Exit taxiway location	
15. Holding areas	
16. Airline gates	
17. General aviation basing areas	
C. ATC Procedures	
18. Aircraft separation	
19. Route data	Improvement #1 and #3
20. Two-way path data	
21. Common approach paths	
22. Vectoring delays	
23. Departing runway queue control	
24. Gate hold control	
25. Departure airspace constraints	
26. Departure queue	
27. Runway crossing delay control	
D. Aircraft Operational Characteristics	
28. Exit taxiway utilization	Improvement #1
29. Arrival runway occupancy times	
30. Touch-and-go runway occupancy times	
31. Departure runway occupancy times	
32. Taxi speeds	
33. Approach speeds	
34. Gate service times	
35. Airspace travel times	
36. Runway crossing times	
37. Lateness distributions	
38. Demand - Demand Input Distribution (Arrivals Permitted on Runway 30 Departure Including B747 Permitted	on Runways 30 and Short Takeoff on 30A)

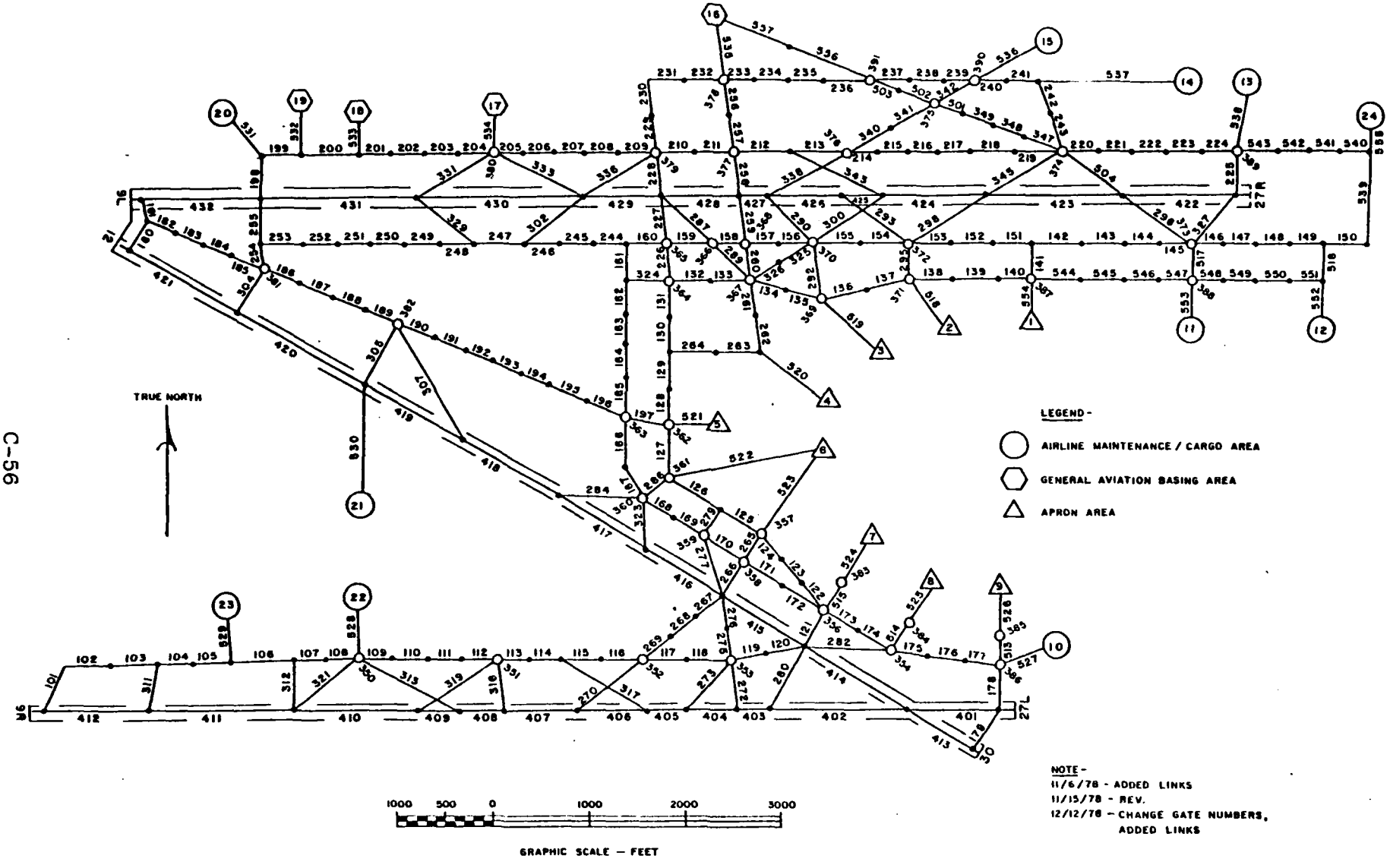

FIGURE 10 - WESTERLY CONFIGURATION IMPROVEMENT WORKSHEET

MIA - STAGE 1

EXPERIMENT NO. 5

Objective:

To obtain baseline delay estimates for the following runway configuration in IFR1 for 1978 demand:

ARRIVAL RUNWAYS	DEPARTURE RUNWAYS
27L, 27R	27L, 27R

Related Comparison Experiments:

Prior experiment 2 examines this configuration with VFR1 weather and 1978 demand.
Experiment 15 assesses the delays that accrue after adding the near-term airport and ATC system improvements to this study case.

Remaining Data Items:

- 1978 Demand input distribution (arrival and departure demand distributions for runway 30 shifted to 27L and 27R).
- Arrival runway occupancy times (from capacity study): Delay study VFR1 values + 5 seconds.

Experiment Number: 5 (Input changes from experiment number 2)

SIMULATION MODEL INPUT	DESCRIPTION OF INPUT CHANGE
A. Logistics	
1. Title	
2. Random number seeds	
3. Start and finish times	
4. Print options	
5. Airline names	
6. Processing options	
7. Truncation limits	
8. Time switch	
B. Airfield Physical Characteristics	Configuration "B" (Westerly)
9. Airfield network	
10 Number of runways	
11. Runway identification	
12. Departure runway and links	
13. Runway crossing links	
14. Exit taxiway location	
15. Holding areas	
16. Airline gates	
17. General aviation basing areas	
C. ATC Procedures	
18. Aircraft separation	1978 IFR Separation Values
19. Route data	
20. Two-way path data	
21. Common approach paths	
22. Vectoring delays	
23. Departing runway queue control	
24. Gate hold control	
25. Departure airspace constraints	
26. Departure queue	
27. Runway crossing delay control	
D. Aircraft Operational Characteristics	
28. Exit taxiway utilization	
29. Arrival runway occupancy times	IFR1 Weather Conditions: VFR1 + 5 sec.
30. Touch-and-go runway occupancy times	
31. Departure runway occupancy times	
32. Taxi speeds	
33. Approach speeds	
34. Gate service times	
35. Airspace travel times	
36. Runway crossing times	
37. Lateness distributions	
38. Demand	Arrival and Departure Demand Distribution for Runway 30 Shifted to 27L and 27R

MIA - STAGE 1

EXPERIMENT NO. 15

Objective:

To assess delays to aircraft in 1983 for the following runway configuration under IFR1 conditions, assuming the Miami near-term airport improvements and the improved (pre-1985) ATC system scenario:

ARRIVAL RUNWAYS	DEPARTURE RUNWAYS
27L, 27R	27L, 27R

Related Comparison Experiments:

Prior experiment 5 serves as the 1978 demand level baseline for comparison to this experiment, wherein no near-term improvements were implemented.
Experiment 20 assesses the delays that accrue after reducing the G. A. traffic of this study case by 50 percent.

Remaining Data Items:

- Near-term improvements to runways 27L and 27R, as described on pages B-1 through B-8 of the Miami International Airport Improvement Program Technical Plan.
- 1983 demand.
- 1983 demand input distributions.
- Will short departures be permitted on runway 30 under these conditions?

Experiment Number: 15 (Input changes from experiment number 5)

SIMULATION MODEL INPUT	DESCRIPTION OF INPUT CHANGE
A. Logistics	
1. Title	
2. Random number seeds	
3. Start and finish times	
4. Print options	
5. Airline names	
6. Processing options	
7. Truncation limits	
8. Time switch	
B. Airfield Physical Characteristics	Configuration "B" (Westerly)
9. Airfield network	
10 Number of runways	
11. Runway identification	
12. Departure runway and links	
13. Runway crossing links	
14. Exit taxiway location	
15. Holding areas	
16. Airline gates	
17. General aviation basing areas	
C. ATC Procedures	
18. Aircraft separation	Pre-1985 IFR Separation Values
19. Route data	Improvement #1
20. Two-way path data	
21. Common approach paths	
22. Vectoring delays	
23. Departing runway queue control	
24. Gate hold control	
25. Departure airspace constraints	
26. Departure queue	
27. Runway crossing delay control	
D. Aircraft Operational Characteristics	
28. Exit taxiway utilization	Improvement #1
29. Arrival runway occupancy times	
30. Touch-and-go runway occupancy times	
31. Departure runway occupancy times	
32. Taxi speeds	
33. Approach speeds	
34. Gate service times	
35. Airspace travel times	
36. Runway crossing times	
37. Lateness distributions	
38. Demand	1983 Demand and Demand Input Distributions (Required from Task Force)

MIA - STAGE 1

EXPERIMENT NO. 20

Objective:
To assess delays to aircraft in 1983 for the following runway configuration under IFR1 conditions, assuming that the upgrading of Opa Locka and Tamiami reliever airports has affected a 50-percent reduction in G. A. traffic at Miami.

ARRIVAL RUNWAYS	DEPARTURE RUNWAYS
27L, 27R	27L, 27R

Related Comparison Experiments:
Prior experiment 15 serves as the baseline for comparison to this experiment, wherein the conditions of this study case were identical except for the 50-percent reduction in G. A. traffic at Miami.

Remaining Data Items:

- General Aviation demand reductions for Class 1 (D), Class 2 (C), Class 3 (B), and Class 4 (A).
  (Total 50-percent reduction in G. A.)

Experiment Number: 20 (Input changes from experiment number 15)

SIMULATION MODEL INPUT	DESCRIPTION OF INPUT CHANGE
A. Logistics	
1. Title	
2. Random number seeds	
3. Start and finish times	
4. Print options	
5. Airline names	
6. Processing options	
7. Truncation limits	
8. Time switch	
B. Airfield Physical Characteristics	Configuration "B" (Westerly)
9. Airfield network	
10 Number of runways	
11. Runway identification	
12. Departure runway and links	
13. Runway crossing links	
14. Exit taxiway location	
15. Holding areas	
16. Airline gates	
17. General aviation basing areas	
C. ATC Procedures	
18. Aircraft separation	
19. Route data	
20. Two-way path data	
21. Common approach paths	
22. Vectoring delays	
23. Departing runway queue control	
24. Gate hold control	
25. Departure airspace constraints	
26. Departure queue	
27. Runway crossing delay control	
D. Aircraft Operational Characteristics	
28. Exit taxiway utilization	
29. Arrival runway occupancy times	
30. Touch-and-go runway occupancy times	
31. Departure runway occupancy times	
32. Taxi speeds	
33. Approach speeds	
34. Gate service times	
35. Airspace travel times	
36. Runway crossing times	
37. Lateness distributions	
38. Demand	50 Percent Less General Aviation

ATTACHMENT D

Miami Stage 2 Delay Experiments

Miami International Airport

Miami
Airport Improvement Task Force Delay Studies

January 1979

TABLE 9
MIAMI DELAY EXPERIMENTS
STAGE 2

Experiment Number	Model	Study Case[a]	Arrival Runways	Departure Runways	Weather	Demand	ATC System Scenario[b]	Near-term Improvements[c]
19	ASM[d]	3	27L, 27R	27L, 27R, 30	VFR2	Pre-1985	Pre-1985	Pre-1985[e]
22	ASM	1	9L, 9R, 12	9L, 9R, 12	VFR1	Pre-1985	Pre-1985	Pre-1985[e], 25% less G.A.[g]
23	ASM	1	9L, 9R, 12	9L, 9R, 12	VFR1	Pre-1985	Pre-1985	Pre-1985[e], 75% less G.A.[g]
24	ASM	5	27L, 27R	27L, 27R	IFR1	Todays	Todays	6[i]
25	ASM	2	27L, 27R, 30	27L, 27R, 30	VFR1	Pre-1985	Pre-1985	Pre-1985[e]+overflow parking[j]
16	ADM[h]	n.a.	n.a.	n.a.	n.a.	Todays	Todays	Todays
26	ADM	n.a.	n.a.	n.a.	n.a.	Pre-1985	Pre-1985	Pre-1985[e]
27	ADM	n.a.	n.a.	n.a.	n.a.	Pre-1985	Pre-1985	None
28	ADM	n.a.	n.a.	n.a.	n.a.	Pre-1985	Todays	Pre-1985[e]
29	ADM	n.a.	n.a.	n.a.	n.a.	Pre-1985	Todays	None
30	ADM	n.a.	n.a.	n.a.	n.a.	Post-1985	Post-1985	None
31	ADM	n.a.	n.a.	n.a.	n.a.	Post-1985	Post-1985	Post-1985
32	ADM	n.a.	n.a.	n.a.	n.a.	Post-1985	Todays	Post-1985
33	ADM	n.a.	n.a.	n.a.	n.a.	Post-1985	Todays	None

[a] Study cases are defined in Figure III-1 of the Miami International Airport Technical Plan (October 1978).

[b] FAA will describe impact of pre-1985 and post-1985 ATC systems on model inputs (as per report No. FAA-EM-78-8A).

[c] Potential near-term improvements are identified in Appendix B of the Miami International Airport Technical Plan.

[d] Airfield Simulation Model.

[e] Task Force will establish packages of near-term improvements most likely to be implemented in the pre-1985 and post-1985 time frames. Improvements to runways 9L/27R, 9R/27L, and 12/30 identified as improvements 1, 2, and 3 in Appendix B of the Technical Plan are most likely to be included in the pre-1985 improvements.

[g] Reduction in general aviation achieved by upgrading Opa Locka and Tamiami General Aviation Reliever Airports.

[h] Annual Delay Model.

[i] Improvement #6 is the use of 2 mile in-trail staggered parallel approaches.

[j] Improvement #8 is the overflow parking positions within the terminal area.